INTERNATIONAL DATA GROUP PUBLICATION VOLUME 10, NUMBER

IBM gives SNA a frame relay ride

Token-ring bridges put through paces by InterLAB, page 4.

BY MICHAEL COONEY

If it hasn't already, frame relay may soon be coming to an SNA network

Users can now build public or private frame relay networks of somewhat limited scope using existing IBM products, including front-end processors (FEP). But a new release of the FEP's Network Control Program (NCP)

Users tell tales of success

BY MICHAEL COONEY

Raleigh, N.C.

Pioneering SNA users that have ventured into frame relay territory are coming back with tales of success, prompting others to follow in their footsteps.

Although some with smaller Systems Network Architecture nets say the benefits of See Success, page 76 Version 7 Release 1 - scheduled to ship in January, will give users more flexibility in mixing and matching IBM and non-IBM frame relay equipment in a Systems Network Architecture

And IBM is making a compelling case for frame relay.

IBM said, and analysts agree, that users can expect an average of 35% savings in line costs with frame relay as compared with dedicated links. Additionally, they can expect a 30% improvement in backbone utilization because wide-area links are used more efficiently and can be shared by multiple types of data.

"Frame relay allows users to con-See IBM, page 76

DEC plunging into ATM mart

Departmental, work group switches among 13 new products announced by company at INTEROP Europe trade show.

BY JIM DUFFY

Digital Equipment Corp. last week leapt headfirst into cell relay networking, announcing a sweeping array of work group, departmental and wide-area ATM products to be released over the next two years.

In all, DEC announced 13 products designed primarily to help position DEC's large base of LAN users to enter the world of Asynchronous Transfer Mode. The lineup positions DEC to do battle with the likes of IBM and Newbridge Networks, Inc. in the nascent ATM market.

The products, announced at INTEROP 93 Europe here, include 10.4G and 3.2G bit/sec ATM switches for departmental and work group nets, both of which support advanced flow control and congestion management features. DEC also unleashed workstation and server adapters, plus line cards and switching modules for its hubs, routers and LAN switches (see page 74).

The announcement indicates DEC's resolve to retain its Ethernet customer base as those users look to reap the benefits of net- DEC muscles into work scalability and multimedia application support that ATM promises.

"We feel this technology is very much in support of customers' need for high-performance virtual work groups, both in the local arena as well as in widely distributed broadband networks." said Alan Raderman, DEC's program manager advanced networking.

DEC's views on ATM echo those of archrival IBM and mux market leader Newbridge Networks.

Last summer, IBM announced a broad array of ATM gear, including an 8G bit/sec campus and wide-area network switch, an 8G bit/sec LAN hub and network interface cards (NW, July 19, page 1). And Newbridge brought out an ATM switching hub, gateways to connect existing LANs to ATM backbones as well as ATM network interface cards, some

ATM game

Announced Asynchronous Transfer Mode (ATM) switches, adapters, line cards and modules for hubs, routers and switches.

Product barrage is DEC's initial foray into expanding ATM

Positions DEC head-to-head against archrival IBM and Newbridge Networks.

of which are priced as low as \$1,000 (NW, March 1, page 1).

Analysts said DEC will also likely face stiff competition from hub vendors with its ATM

"DEC has the basic components, but some competitors are ahead of them in LAN migration and some of the key transition steps," said John Morency, a principal analyst with Strategic Networks, Inc. in Rock-

land, Mass.

For example, DEC lacks the LAN switching capabilities many hub vendors now offer, he said.

Raderman declined to say when DEC plans to offer LAN switching products.

MULTIPURPOSE SWITCH

What DEC will offer is a 10.4G bit/sec premises ATM crossbar switch that can be positioned as a See Plunge, page 74

Chipcom makes ONcore

BY SKIP MACASKILL

Chipcom Corp. rolled out a prototype of its next-generation hub at the INTEROP 93 Europe trade show here last week, giving users a glimpse at its future product direc-

In addition, IBM, which resells Chipcom's existing ONline System Concentrator as the 8250, used the show to introduce a prototype Asynchronous Transfer Mode (ATM) switching hub based on the new Chipcom device and some IBMdeveloped technology.

The Chipcom hub, which

sources said will be called ONcore, will be a multigigabit-capacity box that supports a range of local-area networks and technologies, including Ethernet switching, 100M bit/sec Ethernet and ATM.

It is expected to be officially released in the first quarter of next year and may well be the vehicle that catapults Chipcom into the upper echelon of the hub market segment currently ruled by Cabletron Systems, Inc. and SynOptics Communications, Inc.

ONcore is a 17-slot switching hub that houses full-length interface modules, as opposed to the halfheight interfaces used in the existing ONline System Concentrator. The modules will support Ethernet, token-ring and Fiber Distributed Data Interface LANs.

Like the existing ONline hub, ONcore will have three independent 10M bit/sec Ethernet buses, seven token-ring buses and four FDDI rings. It will add to this Tri-Channel architecture a passive ATM back-See Chipcom, page 78

Auto club to pull plug on host, shift into high gear toward client/server

Headquarters of **British Columbia Automobile** Association (above): Doug Grant, product and corporate systems development manager at BCAA.

BY WAYNE ECKERSON

Burnaby, British Columbia

ew companies are willing to go to the extreme of unplugging their mainframe in the zeal to move to client/server computing. But that's exactly what the British Columbia Automobile Association (BCAA)

Next month, BCAA will disconnect its Hitachi, Ltd. IBMcompatible mainframe and run its business on a dozen Sun Microsystems, Inc. SPARCservers linked to about 750 Macintoshes in 21 sites throughout the Canadian province of British Columbia.

> BCAA believes ditching the mainframe, rather than keeping it around as a data server or to run a few high-volume applications, is a practical, not radical, step to achieve its goals of reengineering the enterprise to better meet customer needs.

The 10th largest automobile club in North America, BCAA offers its 670,000 members emergency roadside service, a variety of insurance products and travel services such as tour packages and hotel, cruise and airline reservations.

"We really had no other choice" but to unplug the host, said Doug Grant, product and corporate See Auto club, page 78

NEWSPAPER

100

Briefs

AT&T takes a Fresh Look. AT&T last week said it has retained more than 95% of the user contracts eligible under Fresh Look, a Federal Communications Commission-mandated period from May 1 to July 29 during which users could have voided their custom network arrangements with AT&T to move to another carrier. AT&T said it kept 146 of 152 Virtual Telecommunications Network Service customers and 359 of 379 companies that use the carrier's Software-Defined Network service's Network Remote Access Express — a feature that provides toll-free access to SDNs. The custom net contracts retained are worth about \$2.5 billion in annual revenue.

Novell boosts host connections. Novell, Inc. last week at INTEROP Europe in Paris announced NetWare for LAT, software that will let NetWare users connect directly to host systems on Digital Equipment Corp. Local Area Transport (LAT)-based nets. The product will be announced in the U.S. this week, a Novell spokeswoman

Also last week, Novell began shipping a new version of NetWare for SAA that will come bundled with run-time versions of NetWare 4.01 and 3.12. NetWare for SAA, which gives NetWare users access to IBM hosts, was previously available only for NetWare 3.11.

Newbridge, LSI target ATM, Ethernet. Newbridge Networks, Inc. and LSI Logic Corp. last week at INTEROP 93 Europe in Paris announced an agreement to jointly develop Asynchronous Transfer Mode (ATM) and Ethernet products based on LSI's ATMizer and Compact and Scalable Dedicated Ethernet (CASCADE) processors. The ATMizer is a Reduced Instruction Set Computing-based ATM processor, while CASCADE is an Ethernet switch on a single application-specific integrated circuit chip that supports up to four dedicated 10M bit/sec links. Newbridge will incorporate the ATM chips into its Vivid Ridge line of ATM switching products.

Merger under investigation. Bell Atlantic Corp. last week said that the Department of Justice will investigate the regional Bell holding company's recently proposed \$20 billion merger with cable television giant Tele-Communications, Inc. (TCI). Analysts have predicted that the deal, if approved, would give Bell Atlantic access to TCI's vast network presence to launch new voice and data services.

PCS organization formed. Six would-be providers of personal communications services (PCS) last week formed the PCS Technology Advocacy Group to help advance technical standards and open interfaces for the emerging wireless communications technology. Founding members include Bell Atlantic Corp.; BellSouth Corp.; Pacific Bell; Canadian-based carrier Stentor; Time Warner, Inc.; and US West Communications, Inc.

Vendors rally around ATM spec. AT&T, Hewlett-Packard Co., NCR Corp., Newbridge Networks, Inc. and Standard Microsystems Corp. last week at INTEROP 93 Europe announced support for a common Asynchronous Transfer Mode (ATM) physical-layer specification. The specification is designed to support ATM over shielded and unshielded twisted-pair cable at speeds of 12M to 155M bit/sec. The specification, presented by AT&T to the ATM Forum in September, is expected to be voted on later this month. The forum is also considering a proposal from IBM.

GDC buys into ATM. General DataComm, Inc. (GDC) last week said it will acquire London-based Asynchronous Transfer Mode developer Netcomm, Ltd., which will operate as a research group within GDC. Terms of the deal, which is expected to be finalized next month, were not disclosed.

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Network HELP desk

questions regarding products, services, technologies or disputes with vendors. Please submit questions to Dana Thorat at (800) 622-1108, via fax at (508) 820-3467 or via the Internet at djt@world.std.com.

We recently dicovered that a previous network administrator used small packets to generate the IPX.COM file that initializes the network interface card (NIC) for our Standard Microsystems Corp. 3016TP cards for our Net-Ware 2.15c network. How does the small packet size affect our network? Should I change the packet size when we upgrade to NetWare 3.11? John Tominack, Indian Head, Md.

Ronald Nutter, escalation manager of 900 Support, a 24-hour-a-day, seven-day-a-week NetWare technical support company in Lake Oswego, Ore.,

There are no real disadvantages to using small packet sizes for your NICs on your NetWare network. However, you do increase network traffic

Network World tracks down answers to your overhead by using smaller packets. Each time a packet is sent, a packet header, which contains information such as the name of the sender and receiver, is also sent. With small packets, header information ties up more bandwidth than medium or large packets because headers are duplicated more often.

On the other hand, forcing the NICs to use small packets gives each user on a congested network an equal chance of getting information to or from the server without long delays.

If you want to help speed data transfer on the network, you should choose medium or large packets because more information can be sent with less overhead. You should keep in mind that the packet size setting is the maximum size of a packet that can be sent. If a NIC's packet size doesn't equal the maximum, it will be sent without being padded to equal the maximum size.

If your current network is working fine with the small packet size, it certainly won't hurt to leave it that way when you upgrade to NetWare 3.11. If you want to make better use of your workstations' cable and transfer data with the least amount of effort and time, change to large packet size. And if you decide

See Help desk, page 58

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Token-ring bridges grow up

BY MAUREEN MOLLOY

Sea Girt, N.J.

Token-ring bridges have come a long way in the past year, with most now capable of satisfying demanding performance needs. But there's room for improvement in how reliably they forward traffic and sharp differences in how much that dependability costs.

The results of token-ring bridge performance tests to be released this week by Inter-LAB, an independent network test and consulting firm, revealed that all nine bridges examined offer similar throughput. That is, virtually all can push data through at a tokenring wire speed of 16M bit/sec.

In an effort to help users distinguish one product from another, Inter LAB then set out to examine two other criteria: latency rates and price/performance. These two areas revealed a diversity of results.

THE GOOD NEWS

InterLAB President Kevin Tolly tested the nine bridges as they passed packets between two 16M bit/sec token-ring networks and, depending on the port capacities of the bridge, for four-, eight- and 16-port configurations. Starting with 64-byte frames, he examined the devices' performance using progressively larger packet sizes — up to 16K bytes.

In the 64-byte frame test, all but one vendor exhibited packet forwarding speeds in excess of 8,000 packet/sec.

This contrasts with last year's test, when

nearly two-thirds of the 15 bridges tested were incapable of surpassing the 4,000 packet/sec

While Cisco Systems, Inc.'s high-end 7000 pulled in the most impressive performance with a whopping 18,353 packet/sec, IBM's personal computer-based LANStream bridge won hands down in the "most improved player" category.

Before IBM introduced the LANStream chipset last spring, its bridge had a maximum packet forwarding speed of 3,700 packet/sec. IBM ported the LANStream technology to its bridge program, and performance this year shot up to 15,550 packet/sec.

"It's the most significant performance improvement ever in token ring," Tolly said. "Once IBM begins [distributing] the chip to other vendors to run on proprietary bridge/router platforms, performance numbers will go through the roof."

In the 2K-byte frame test — a packet size indicative of a typical file-transfer application - eight of the nine bridges ran at near wire

THE NOT-SO-GOOD NEWS

Although the vendors have tweaked their respective bridges to excel at packet forwarding, most need to lower latency to better ensure that all packets make it to their final destina-

Latency is how long it takes for a single packet to traverse the bridge. The shorter the

latency, the better the performance since the device then runs a smaller risk of dropping packets.

The results revealed that bridge latency reduces effective throughput of a Novell, Inc. file-transfer application anywhere from a low of 22% when Cisco's 7000 bridge/router was used, to a high of 44% with 3Com Corp.'s NETBuilder II bridge/router (see graphic, this page). Tolly said a latency rate exceeding 30% can cause performance problems.

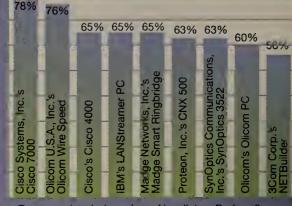
"Conventional wisdom says that if you put a single client's data across your bridge, there won't be any degradation because it's only one client and, therefore, it won't generate enough traffic to load down the bridge. But the fact of the matter is, it does," Tolly said.

He cautioned, however, that in some cases it will be the application — not the bridge that is at the root of performance degradation. That is because latency deals with end-to-end session throughput and, thus, includes any delay caused by adapter, driver, protocol or application bottlenecks present in the end sta-

With certain applications, such as a Transmission Control Protocol/Internet Protocolbased file transfer application, the inherent end-station delay is so great that the presence of a single bridge between the end stations does not alter throughput.

Tolly said users should run similar latency benchmarks, especially when moving highperformance client/server applications several hops apart on a campus net, to determine what impact a bridge's latency will have on applica-

Quantifying token-ring bridge latency Throughput (% of 16M bit/sec speed reached) 65% 65% 65% 63% 63%



Tests consisted of running a Novell, Inc. Perform3 application between a client and server residing on the same token-ring LAN.

GRAPHIC BY SUSAN SLATER

Another interesting finding concerned price/performance ratios. Simpler PC-based offerings from IBM, Madge Networks, Inc. and Olicom U.S.A., Inc. were naturally less expensive than high-end bridge/routers from Cisco, Proteon, Inc. and 3Com.

But when comparing the per-port cost of each unit, the differences were striking. The cost of a single token-ring port on IBM's LAN-Stream, for instance, is \$860, while a single port on a Proteon, Cisco or 3Com module costs \$1,995, \$2,300 and \$2,995, respectively.

"We found that price and performance don't necessarily correlate because there were some very high performance numbers from relatively low-cost PC-based routers," Tolly said. IBM's LANStreamer, for instance, is significantly less expensive than stand-alone bridge/routers but offers performance similar to those higher end devices.

Banyan mulls Unix move for native VINES

BY CHRISTINE BURNS

Westboro, Mass.

Banyan Systems, Inc. is considering changing the flavor of the Unix it uses as the foundation for its native VINES network operating system.

A switch from the current Unix kernel embedded in Banyan's flagship product to a more open version could give users the ability to run VINES on more hardware platforms and take advantage of network features and application development tools not avail-

'Whatever alternatives exist out there today, we're investigating them and testing them in our labs," said Pamela Campagna, Novell's VINES product-line manager. "There's a lot to weigh when you're talking about moving to a new revision of Unix.

The list of Unix flavors under consideration includes Novell, Inc. Unixware, IBM AIX, Hewlett-Packard Co. HP-UX and Sun Microsystems, Inc. Solaris. But don't expect it anytime soon. Another Banyan source said the decision will not be made for 12 to

While Campagna confirmed that the Unix change for native VINES is an ongoing consideration, she was quick to distinguish between that and the company's plans to roll out products within its VINES for Unix product line.

With the release of VINES for SCO Unix last year, Banyan pulled the security, net management, intelligent messaging and Street Talk directory services out of native VINES and ported those foundation services to The Santa Cruz Operation, Inc.'s SCO Unix platform, which runs on Intel Corp.-based machines.

Banyan earlier this year said it will continue in that

vein by porting those services to HP-UX, AIX and Solaris in the first, second and third quarters of 1994,

respectively.

Unix source code traditionally comes from three different sources: Unix System Laboratories (USL), which produces Unix System V and is owned by Novell; Open Software Foundation, Inc., which ships OSF/1 as an alternative to System V; and Berkeley Software Distribution (BSD), a Unix development effort that sprung out of the University of California at Berkeley.

Vendors license the Unix code from one of these suppliers and modify it to exploit specific features. In 1988, Banyan licensed USL System V Version 3.0 to use as the basis of native VINES and has not moved up to a new revision since.

In the interim, USL System V Version 4 has been adopted as an industry standard because it comprises pieces of BSD, Microsoft Corp.'s Xenix and Sun's SunOS. It has been lauded for its openness because it makes it easier for users to exchange files with other Unix systems and build and support distributed, protocol-independent applications.

"The current version of Unix that Banyan is using is ancient, and a lot of the new Unix development tools included in newer versions can't be used," said one application developer who builds products for native VINES. He said the major problem with the version of Unix that VINES uses is that its C compiler has long been outdated and does not support the current versions of the Clanguage.

While the jury is still out regarding Banyan's choice for a new Unix base, several native VINES users and Unix industry analysts agree that a move to Solaris might make the most sense.

Mary Hubley, a Unix systems analyst with the Datapro Information Services Group, located in Delran, N.J., said Solaris 2.0 is a full-featured Unix operating system in terms of communications tools, protocols and programs.

According to International Data Corp., a research firm in Framingham, Mass., Solaris leads the Unix market in terms of worldwide unit shipments with 16.3% of the market.

Hubley said another selling point for Solaris is that it can run on both Intel Corp.-based personal computers and servers as well as Reduced Instruction Set Computer (RISC) workstations, namely Sun's own line of SPARCstations.

Martha Dooley, a consultant with New York-based systems integrator The Future Now, said she believes customers will be interested in having native VINES based on a version of Unix that could run on both RISC- and Intel-based servers.

"Having one system based on Solaris that would automatically run on all types of boxes is exactly what I'm looking for," said a New York-based user who runs a strictly native VINES shop. "Having to go through all these gyrations to make sure it runs on an NCR [Corp.] box or an IBM box would disappear. We'd have platform independence."

While users say they would be pleased to see VINES grounded in a more open Unix platform, they also fear that porting their existing networks to a platform may present a major stumbling block.

Wynn Obermeyer, director of vision services at Inacom, an Omaha, Neb.-based systems integrator, which also runs all of its networks on native VINES, said upgrading to any version of Unix might be difficult for VINES users.

"Because of the nature of the Street Talk directory services, all of your users, your files, your mail and your servers are held in Unix System V databases," Obermeyer said. He said that having to add a database conversion while completing a software upgrade would lessen his enthusiasm for upgrading his system to a more open version of Unix.

©Banyan: (508) 898-1000.

Growing VINES Product history highlights First version of VINES ships with StreetTalk global naming service. Unix System 5 Version 3.0 implemented in VINES 3.0. VINES 4.0 ships with enhanced directory service and 50% Apple Computer, Inc. Macintosh client support. VINES directory, security, management and intelligent messaging services ported to The Santa Cruz Operation, Inc.'s SCO Unix for Intel Corp. based mechines. Corp.-based machines In January, VINES 5.5 is released with a new version of StreetTalk III. In September, VINES 5.53 offers users increased hardware support.

VINES foundation services will be ported to Hewlett-Packard Co.

HP-UX, IBM AIX and

SOURCE: NETWORK WORLD

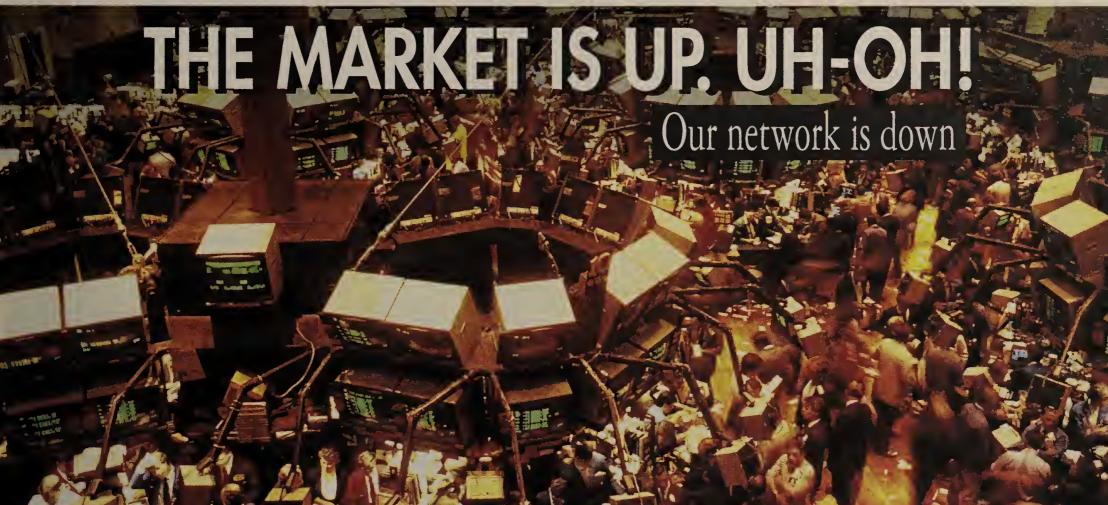
GRAPHIC BY SUSAN J. CHAMPENY

Sun Microsystems, Inc. Solaris platforms.

Expected release of VINES running an a new flavor of Unix.



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IETF MEETING

Users feel crowded as TCP/IP's success grows

and MAUREEN MOLLOY

Houston

Although business use of TCP/IP is exploding, its popularity is getting in the way of its continued success, an issue that will top the agenda at the Internet Engineering Task Force (IETF) meeting here this

The current IP routing protocol lacks sufficient addressing space to keep up with the skyrocking number of networks based on Transmission Control Protocol/Internet Protocol, a time bomb made all the worse by ever increasing use of the TCP/IP-based

After long debate over possible IP replacements, the Internet community that oversees TCP/IP has narrowed the field to three candidates, one of them based on Open Systems Interconnection.

For users, the dwindling supply of TCP/IP addresses is one of the biggest issues they face. "It's a network layer replacement problem," said Eric Fleishman, senior principal scientist and network architect of technical services at Boeing Computer Services in Seattle.

With addresses running out fast, Fleishman said several of Boeing's strategic vendors are asking what Boeing wants them to do regarding next-generation IP. The company has 80,000 hosts on its TCP/IP

Philip Gross, chair of the IETF, said scaling TCP/IP for future growth is the key issue his group faces. "We're stressing the system and decisions need to be made soon."

As a result, the IETF this week will focus on both short- and longterm solutions to the address shortage problem.

THE BAND-AID APPROACH

The IETF earlier this month formed a new working group charged with determining how much life is left in IP Version 4. Called the Address Lifetime Extension Group, it has been charged with determining how long the makeshift efforts employed by the IETF to conserve address space can

The primary survival tactic the IETF has used is adoption of Classless Interdomain Routing (CIDR), which removes the drawbacks of IP's existing three-tiered address

With IP today, Class A nets, of which there are 128, support as many as 17 million nodes each, while the 16,000 Class B nets support as many as 64,000 nodes and Class C nets — the most ubiquitous at 2 million —

Choosing TCP/IP's fate

3 proposed alternatives to IP Version 4

Combines elements of "P" IP and "S" IP, 2 previously competing alternatives that merged earlier this month. The new SIP-P calls for use of a new IP packet header that eliminates some fields and restructures others, allowing larger addresses to be used without increasing address header size. It is backward-compatible with IP at the binary level, enabling it to support existing IP applications.

Contains a 64-bit address field. Is backward-compatible with the current IP but is seen by many as a one-man proposal lacking a constituency

The TCP/User Datagram protocol with Bigger Addresses (TUBA) is OSI-based. It takes advantage of the nch OSI addressing scheme for the Connectionless Network Protocol and uses a dual-stack approach that relies on the application layer to link legacy TCP/IP-based systems with

support a maximum of 250 nodes apiece.

CIDR essentially eliminates class boundaries by letting users aggregate multiple Class C nets. A user with 1,000-nodes, for instance, could string together four 250node Class C nets to support them instead of requiring a single 64,000-node Class B net. Conversely, CIDR also enables users to carve out pieces of a Class A net to suit their requirements.

"We found that giving out a Class A net usually meant giving away a huge chunk of address space, while Class C nets were ignored because they were too small for most users' requirements," Gross said. "We could kick ourselves now for being so waste-

Advanced Network & Services, Inc., which provides the Internet with T-3 backbone services, has begun deploying CIDR in See TCP/IP, page 8

these through the channel," National's Karlin said. The companies also disclosed that in the first quarter of next year, Novell's Personal NetWare will ship bundled with National's NE2000 adapter.

National Semiconductor enters networking arena

BY CARYN GILLOOLY

San Francisco

As expected, National Semiconductor Corp. last week broadened its product purview with the release of a family of adapter cards that will bring the company out of the chip-only business.

Under an agreement with Novell, Inc., the adapters will be sold in Novell-red boxes

distributed through Novell's reseller channels.

National said the network interfaces are only the first of many forthcoming network products, with future releases planned in the fast Ethernet and Asynchronous Transfer Mode (ATM) arenas. The company also said it will team with Novell to develop products in other areas, such as multimedia.

"National Semiconductor is

making a change in the way it's doing business," said Geof Karlin, director of product marketing at National, based in Santa Clara, Calif. "The marketing dynamics have changed. We see that it's no longer possible to be just a chip vendor."

STEP 1

The release of the InfoMover adapter card family is the first step in the company's evolution. The InfoMover NE2000plus is a 16-bit Industry Standard Architecture (ISA) Ethernet card, which costs \$109 for the 10Base-T version and \$119 for the coaxial version. For mobile users, National introduced the InfoMover NE4100 PCMCIA adapter, priced at \$249.

For higher speed needs, National brought out the InfoMover NF3000 Fiber

Distributed Data Interface adapter. This card supports fiber, shielded or unshielded twisted-pair cabling in ISA and Extended ISA environments. Prices range from \$1,345 for the ISA unshielded twisted-pair version to \$1,995 for the fiber version.

National's cards will ship with Novell's Open Data-link Interface (ODI) drivers, as well as NDIS 2.0 drivers for Microsoft Corp.'s LAN Man-

ager and Windows for Workgroup products, Network Basic I/O System drivers for Artisoft Corp.'s LANtastic and Banyan Systems, Inc.'s VINES, and the Packet Driver for Transmission Control Protocol/Internet Protocol-based nets. All are available now.

Initially, the cards will be cobranded by National and Novell, and will be sold in a Novell-red box by Novell's resellers. "We need to develop the infrastructure to deliver

STEP 2

But the Novell relationship does not stop there. National and Novell stated that they will work together to develop a multimedia transport, working first to establish a way to provide video services on the network.

"The companies have agreed to jointly develop technologies for both client and server that will lead to video transport and playback over the network," according to documents issued by the companies. "Initial joint development activity includes high-performance Ethernet and [ATM] adapter technologies for video playback applications."

Neither company would provide further product specifics in any of the planned technology areas. Despite the lack of concrete details, observers were optimistic about the National announcement and predicted that the vendor would be able to shed its reputation as a chip-only company.

"This is a very positive move for National," said Marty Palka, principal analyst at Dataquest, Inc., a research and consulting firm based in San Jose, Calif. "First of all, distribution is the key to success, so leveraging Novell's channels is a good way to take care of that. "Longer term, I think National can be as successful as Intel [Corp.] in the [network interface card] business,' Palka said, noting that Intel currently holds the No. 3 slot in the adapter market.

Cabletron prepares for **APPN** rollout

BY SKIP MACASKILL

Cabletron Systems, Inc. last week offered users a preview of coming SNA attractions when it demonstrated APPN Network Node support on its intelligent hub at the INTEROP 93 Europe trade show here.

The Advanced Peer-to-Peer Networking feature is expected to debut by the end of the year on an integrated routing module for the Multi Media Access Center (MMAC). It will be the first of a series of Systems Network Architecture products Cabletron will roll out throughout 1994.

APPN on a hub will give users another configuration option as they migrate to a peer-to-peer SNA environment and should simplify management by consolidating SNA routing and hub functions.

APPN is IBM technology that simplifies configuration chores and lets SNA nodes talk as peers. Network Nodes supply routing and directory services in APPN

nets for attached End Nodes, which are typically client or server machines.

"As users pull their SNA worlds forward into client/server environments, Network Node becomes a key enabler because it allows them to route their SNA traffic in a peer-to-peer fashion,"

said Tom Burkardt, director of IBM connectivity products at Cabletron.

Cabletron is using APPN software it licensed late last month from Data Connection, Ltd. in the U.K., the only company other than IBM that licenses APPN code. For the prototype used at the show, Cabletron ran the code on its existing Ethernet, Token Ring, Wide-area network Media Interface Module (ETW-MIM), an integrated routing module for the MMAC that routes traffic between Ethernet and token-ring local-area networks, and across the WAN.

But Burkhardt said the APPN Network Node could be implemented on any existing or future Intel i960-based hub modules.

Other products Cabletron will unveil next year to complement its APPN support include a module for channel-attaching hubs to a mainframe and software that supports the Simple Network Management Protocol over SNA transports, Burkhardt said. These will add to Cabletron's existing SNA lineup, including the SNA Conversion Media Interface Module (SNAC-MIM), which allows 3270 Synchronous Data Link Control traffic to run over LANs by converting it to a Logical Link Control-2 format.

The company also rolled out BlueVision earlier this year, software that supports an LU 6.2 link between Cabletron's Spectrum management platform and IBM's NetView. "When we asked users what was preventing them from moving to Network Node, their No. 1 response was their 3270 applications," Burkhardt said. "With SNACMIM and BlueVision, we've established a foundation to address that, and these new products will build on that."

Michael Howard, president of Infonetics Research, Inc., a consultancy in San Jose, Calif., said APPN is becoming increasingly important to users.

"The router vendors have not found a way to route SNA traffic via TCP/IP that maintains the most critical metric in the SNA world, which is response time," he said. "APPN is gaining in importance because things such as [Cisco Systems, Inc. Advanced Peer-to-Peer Internetworking routing scheme] have not been able



AT&Tannounces global frame relay packages

BY BOB WALLACE

AT&T last week said it will begin offering users with sites in Europe turnkey frame relay packages that include everything from consulting services to network circuits and equip-

AT&T's Enhanced Connectivity Options (ECO), which have been available domestically since January, complement the carrier's InterSpan Frame Relay Service, which is offered in the U.S. and 16 Western European countries (see graphic, this page).

The ECO turnkey frame relay packages, available in standard and premium versions, are designed to let U.S.-based multinationals and European firms farm out aspects of building and managing global frame relay nets.

'ECO, in general, gives users the option of turning the responsibility of day-to-day operations of their frame relay networks to AT&T so

business,"

InterSpan

ern Europe.

need

"Users

AT&T manager

Global reach of NT&T's frame relay

AT&T's InterSpan Frame Relay Service is available in the following European

- Austria
- Belgium
- Denmark ☐ Finland
- France
- Germany

- Luxembourg The Netherlands
- Norway
- Portugal
- Spain
- Sweden
- Switzerland

mentation (NW, Oct. 18, page 28).

diagnostics.

work, Rosenbaum said

CONSIDERING THE OPTIONS

vice is to be installed. That's where the user's

link into the frame relay net will be configured,

Under ECO Standard, AT&T will also monitor users' frame relay nets from a Global Net-

work Management Center in the U.K. AT&T

prewired and tested for interoperability.

technicians will dial into user nets and retrieve data from Simple Network Management Protocol-based AT&T and Cisco customer premises

Monitoring done from the U.K. center will be supplemented by NCR field technicians in each country who will be able to help solve problems.

Technicians at the U.K. facility also will work in tandem with technicians at AT&T's frame relay network operations center in South Plainfield, N.J., to solve user problems. Users will have the choice of a single point of contact, either in Europe or in the U.S.

AT&T's premium ECO Plus turnkey frame relay package will provide users with all of the same offerings as ECO Standard, plus ongoing router management. That will include router configuration, which is needed for adding sites to a user's frame relay net, Rosenbaum said.

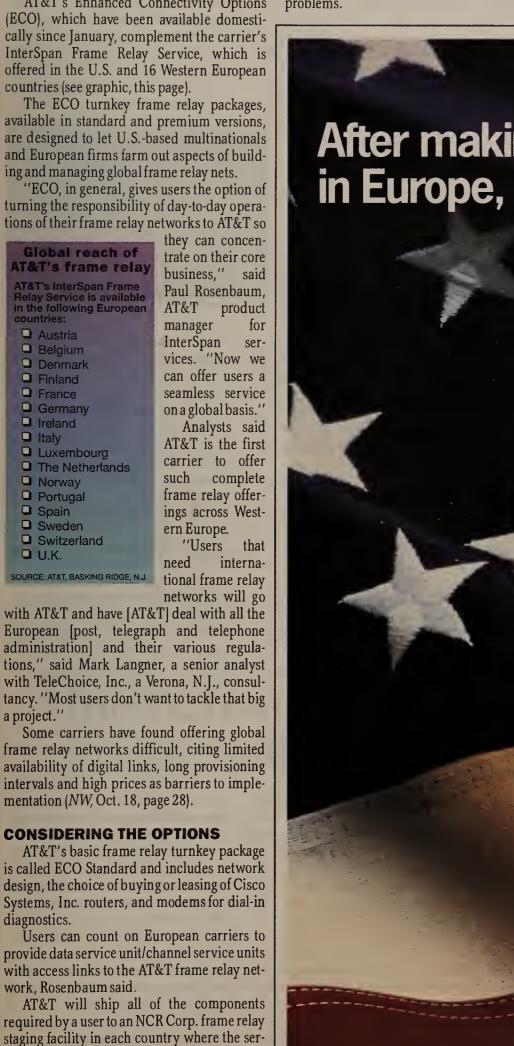
Three maintenance options are available with both ECO Standard and ECO Plus. They

include a standard business day plan under which the carrier will monitor the equipment Monday through Friday from 8 a.m. to 5 p.m.; a second plan that covers those same hours but seven days a week; and around-the-clock cov-

AT&T will also hold an annual review of each user's network with the user and its Bell Laboratories research and development unit.

ECO Standard and ECO Plus will be priced on a case-by-case basis. The offerings are in controlled introduction with general availability planned for early 1994.

©AT&T: (800) 247-1212.





E-mail products and initiatives to debut

BY WAYNE ECKERSON

Santa Clara, Calif.

A host of E-mail vendors, including Hewlett-Packard Co., Alisa Systems and members of the Message Handling Service (MHS) Alliance, are expected this week to release new products and initiatives at the E-Mail World Conference and Exposi-

The MHS Alliance, a consortium of 40 electronic mail vendors, will release a draft interoperability specification for MHS-based group scheduling products as well as a testing and certification program for MHSbased products. The certification program is being done in conjunction with Novell, Inc., which holds the license to the MHS E-mail transport technology.

The group scheduling specification defines how different vendors' products will be able to share information in five areas: establishing common meeting times; sending meeting notices to participants; modifying meeting information; cancelling a meeting; and rejecting or accepting a meeting invitation.

The specification was developed over the last four months by MHS Alliance calendaring subcommittee members Campbell Services, Inc., Microsystems Software, Inc., On Technology, Inc. and Powercore International, Inc.

The draft specification is designed to elicit feedback from vendors and users. A final specification will be ready by mid-1994.

Also, the MHS Alliance is working closely with the X.400 Application Program Interface Association (XAPIA), which plans to issue a specification that will enable calendaring products to exchange information across multiple network environments. The MHS Alliance specification is for NetWare networks only.

Separately, the MHS Alliance will announce that it is working with Novell to develop a testing and certification program for MHS-compliant applications and gateways. An interoperability specification will give users the assurance that MHS products from different vendors will work together, said John Rizzi, president of the MHS Allliance and marketing manager at On Technology.

Novell will conduct all testing and conformance procedures.

In other news, Alisa Systems will announce that it is providing open access to its OpenDirectory directory services software, which runs on a Sybase, Inc. SQL Server relational database. This will enable users to access the directory not only using Alisa Systems' PeopleFinder query tool, but also via third-party vendor query tools users may already have installed.

OpenDirectory provides a corporatewide directory for storing names, postal and E-mail addresses, facsimile numbers and other information, such as photographs.

Alisa Systems currently provides its PeopleFinder query tool as a way to scan OpenDirectory for names, titles, organization or location of net users and resources. As an E-mailbased tool, PeopleFinder runs on DOS, Apple Computer, Inc. Macintosh, Unix and Digital Equipment Corp. VAX platforms.

In addition, users will be able to link OpenDirectory to other databases, allowing users to download name and address information from other sources into OpenDirectory. This makes it easy to populate the OpenDirectory and keep it synchronized with other critical information

Alisa Systems will now support any client/server query tool that employs Microsoft Corp.'s Open Database Connectivity interface for accessing databases.

OpenDirectory comes bundled with AlisaMail. The package costs about \$10,000 for an entry-level system supporting 100 users.

HP is expected to announce soon that IBM will resell its HP OpenMail message system, and that Soft-Switch, Inc. will port its Enterprise Mail Exchange (EMX) message switch to HP's 9000 series

A move by IBM to resell HP OpenMail would be a boon to both companies. Reselling HP OpenMail would give IBM a

scalable, X.400-based E-mail engine, which it currently lacks, analysts said. HP would gain visibility for its E-mail system, which provides the enterprisewide connectivity and management tools missing from many popular local-area networkbased E-mail systems.

The agreement with Soft-Switch

would make HP-UX the second platform on which its EMX message switch will run. EMX currently runs on Data General Corp.'s AViiON servers, but an exclusive contract between Soft-Switch and Data General will expire soon and give Soft-Switch the chance to port EMX to other platforms.

TCP/IP

Continued from page 6

the Border Gateway Protocol of its IBM T-3 routers to do CIDR routing and aggregation of addresses.

Despite its expected success in extending the life of IP, CIDR merely

postpones, but does not prevent, the eventual exhaustion of the current 32-bit IP address space which most observers agree is too small for global use.

"We could last for one or two years," predicted Christian Huitema, chairman of the Internet Architecure Board, which oversees the IETF's work and the technical work done by the Internet Engineering Steering Group FLEISHMAN AND HUITEMA (IESG).

To address the long-term ramifications of the Internet explosion, the IETF this week will tackle what is known as IP: The Next Generation (IPng). This topic is expected to touch off a lively, if not fiery, debate over what should be used to replace IP Version 4 (see graphic,

Although the decision on IPng will not be made this week, the IETF technical group known as the IPng Area Group — formed earlier this month as a temporary working group — will present a status report and its recommendations to the IESG.

The field has been narrowed to three candidates, down from four due to the merger earlier this month of the so-called "P" IP and SIP proposals. "P" IP and

SIP — which together is now known as SIP-P — and a second proposal called TPIX, are both based on IP. A third proposal, dubbed the TCP/User Datagram Protocol with Bigger Addresses, called TUBA, is OSI-based.

The U.S. government has thrown its support behind CIDR and TUBA. But for the often sparring TCP/IP and



OSI communities, the embrace of an OSI-based proposal might be the technical equivalent of the Palestinian-Israeli peace summit.

"We have a choice between several good proposals," Huitema said. "But I'm afraid if we take a standard based on OSI we won't "own" the standard. If we own the standard, we can work very fast."

The selection of TUBA would foster a convergence between OSI and TCP/IP, something that many users now hope will happen.

'The only way the IETF can make a decision is if we find consensus," Huitema said. "There's only a certain amount of time, and people feel an urgency about it."

E-mail product roundup

More than a dozen electronic mail vendors are making announcements to coincide with the E-Mail World Conference and Exposition here this week. Here is a sampling:

Amadeus Systems Corp. of Vienna, Va., and Novell, **Inc.** in Provo, Utah, are expected to announce gateways between Novell's Global Message Handling Service and Lotus Development Corp.'s cc:Mail and Microsoft Corp.'s Microsoft Mail.

MacSoft, Inc. of Bakersfield, Calif., will introduce a new version of its Lightspeed MAIL Gateway, which provides transparent connectivity between Wang Laboratories, Inc.'s OFFICE and personal computer local-area network-based E-mail applications, such as Microsoft's Mail. It will also synchronize directories.

Beyond, Inc. of Burlington, Mass., will announce availability of BeyondMail 2.0, which provides enhanced work flow capabilities and connectivity to E-mail systems based on Novell's Global Message Handling System (MHS). The new release also contains interfaces to Lotus' Notes 3.0 and Watermark Software, Inc.'s Explorer Edition imaging system.

Control Data Systems, Inc. will announce enhancements to its Mail*Hub E-mail system, including support for the 1988 X.400 standard. The company will

also make available Mail*Hub for Sun Microsystems, Inc.'s SPARCstations running SunSelect's Solaris 2 Unix-based operating system.

Baranof Software, Inc. of Brighton, Mass., has added rules technology to Version 1.2 of its Mail-Check E-mail management system. The new Alert Rules technology will enable Baranof's product to automatically respond to system failures, slowdowns or other problems associated with E-mail operation. MailCheck is available for personal computers, and Macintosh and Unix systems. It works in conjunction with most E-mail systems, including cc:Mail, Microsft Mail and MHS-based products.

Retix and Zoomit Corp. are expected to announce a gateway between Retix's OpenServer 400 and Banyan Systems, Inc.'s VINES Mail.

Wingra Tecnologies, Inc. of Madison, Wis., has announced a new utility for its Missive electronic messaging switch that synchronizes directories in DEC's Distributed Directory Service and cc:Mail. In addition, the Missive switch now contains a document conversion utility from Keyword Office Technologies, Inc. that translates documents between Email systems. The enhancements will be shipped

> BY WAYNE ECKERSON AND PETER LISKER

Cisco teams with third parties to port routing

BY MAUREEN MOLLOY

Cisco Systems, Inc. last week announced its intention to broaden its routing horizons by developing router cards that work with Microsoft, Inc.'s Windows NT Advanced Server and LanOptics, Ltd.'s intelligent hub.

At the INTEROP Europe show here last week, Cisco also announced a net management application that promises to ease the router configuration process by letting users replicate the same configuration across multiple routers. Additionally, the company announced an agreement with NCR Corp. to market the latter's Asynchronous Transfer Mode (ATM) switch.

The personal computer-based router card Cisco will develop with Microsoft will essentially let a machine

running Microsoft Windows NT Advanced Server function as a multiprotocol router.

Michael Edelman, information systems consultant at Sequent Computer Systems, Inc. in Beaverton, Ore., said that will lower the cost of deploying distributed servers over a wide-area net.

"Until now, the PC arena hasn't really embraced the concept of fully functional networking. With Cisco as the leading internetworking vendor and Microsoft as the leading operating system supplier in the PC arena, I'm looking forward to having some good products come from this," he said.

The four-port router module will be available on Industry Standard Architecture- and Micro Channel Architecture-based adapter cards, and will sup-

See Cisco, page 61

Hayes enters low-priced 28.8K modem market

BY JIM DUFFY

Norcross, Ga.

Hayes Microcomputer Products, Inc. this week will fan the flames of the high-speed modem market when it unveils a 28.8K bit/sec device priced at about \$600.

Hayes's Optima 288 V.FC + FAX is a dialup modem that the company claims can reach speeds up to 230.4K bit/sec with data compression. The high-speed modem is designed to support applications such as remote local-area network connectivity, large file transfers and

The Optima 288 could even be used as an alternative to switched 56K bit/sec services, Hayes officials said.

The modem is based on Rockwell International Corp.'s V.FastClass chipset, a proprietary precursor to the imminent ITU V.34 modem standard (formerly CCITT V.fast) for 28.8K bit/sec transmission over the public switched network.

Hayes' announcement follows a similar move by Microcom, Inc., which recently rolled out a 28.8K bit/sec modem for \$499 (NW, Oct. 18, page 4).

The pricing strategies by Hayes and Microcom, two of the most influential dial-up modem vendors, are sure to touch off a price war, analysts said. Other vendors' 28.8K bit/sec devices are priced at \$1,000 and above.

At the prices Hayes and Microcom are proposing, "users can feel confident about jumping into [28.8K bit/sec]," said Lisa Pelgrim, an

Video system gains network management

BY ELLEN MESSMER

Videoconferencing Systems, Inc. (VSI) last week announced a new version of its Omega roll-about videoconferencing system that includes a mouse-controlled graphical user interface and network management features.

VSI, a value-added integrator, combines videoconferencing coder/decoders, inverse multiplexers and cameras made by vendors of the user's choosing to create custom videoconferencing systems. Omega, the company's dual-screen roll-about system, now comes with a computer-based control system that supports enhanced configuration options and lets users manage the various components.

The Omega comes packaged with the usual push-button control panel for call setup and shutdown. But for those who may find videoconferencing simpler through point-and-click operation, the Omega mouse-controlled interface lets users adjust cameras or initiate a call by just pointing at the proper icon on the videoconferencing monitor.

The Omega's network management capabilities extend to simple monitoring of videoconferencing peripheral equipment, such an inverse multiplexer, a videocassette recorder

See VSI, page 61

analyst at Dataquest, Inc., a San Jose, Calif., consulting firm. Prices for 28.8K bit/sec modems will fall to about \$300 next year, she

The Hayes modem achieves 8-to-1 compression through enhancements to the V.42bis data compression standard, which typically supports 4-to-1 compression, and its ESP Communications Accelerator board.

Hayes is using a faster microprocessor in the Optima 288 than is used in other modems. It is also implementing V.42bis differently from most other vendors, though in a nonproprietary manner.

"We are not doing anything that's nonstandard to V.42bis," said Alan Bach, Hayes' Optima 288 product manager. He said Hayes has found a way to implement V.42bis so that modems can achieve greater than 4-to-1 compression and negotiate handshakes faster.

The high throughput would not be possible, though, without Hayes' ESP Communications

Accelerator board. The board fits into a personal computer expansion slot and is designed to increase the throughput between the modem and PC for high-speed transmissions.

Microcom gets around this problem by attaching its 28.8K bit/sec DeskPorte FAST modem to a system's parallel port, which provides a 500K bit/sec link between the PC and

The Optima 288 costs \$579 and is available now. The Hayes ESP Communications Accelerator costs an additional \$99 and is also avail-

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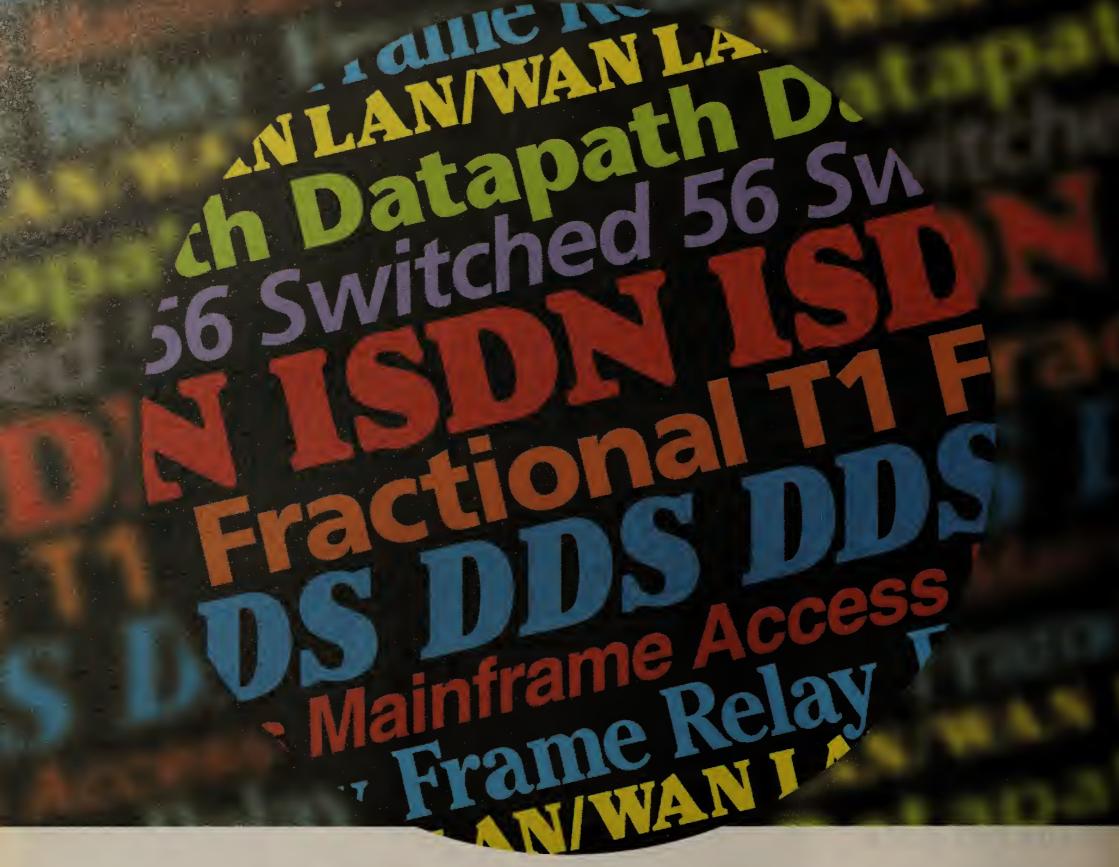
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ENTERPRISE INTERNETS

Data Network Architectures, Standards, Equipment and Management

IBM NETWORKING

HPR promises to make APPN more efficient

BY MICHAEL COONEY

Raleigh, N.C.

In its struggle to make Advanced Peer-to-Peer Networking (APPN) a market force, IBM is working feverishly to make the technology as bulletproof as possible.

The latest and perhaps most impor-

tant part of this effort will be the addition of High Performance Routing (HPR) software to existing APPN nodes. HPR promises to eliminate nagging problems with the technology by adding dynamic rerouting around failures, performance, improved data flow control and class-of-service features.

By the end of the year, IBM expects to have HPR implemented in all of its major products, including the Application System/400, 3174 Establishment Controller, Communications Manager/2, VTAM, Network Control Program, the 6611 multiprotocol router and 3172 Interconnect Controller.

IBM also made the HPR specification public at its last APPN Implementor's Workshop so that third-party vendors could begin developing their own APPN/HPR implementations.

HPR is considered by most industry observers to be the key ingredient to

APPN's ultimate success because it eliminates the main differences between it and the chief competing technology, Transmission Control Protocol/Internet Protocol.

The two main components of HPR Automatic Network Routing (ANR) and Rapid Transport Protocol (RTP) —

> give APPN nets the ability to dynamically route data around network failures and provide a three-to tenfold performance improvement.

Together, ANR and RTP will replace the current APPN Intermediate Session Routing (ISR) function, which operates

at Layer 4 of the Open Systems Interconnection model, and move APPN routing down to Layer 3 of the network. That will reduce the processing and memory requirements on each node in

Today, when data crosses an APPN net, it must stop at each intermediate Network Node (NN) along the way to report routing information such as destination and priority.

ANR streamlines that procedure by putting a modified APPN header on each packet that lets each intermediate node more immediately determine the

See GDC, page 14

CA rolls out new Star software for distributed systems mgmt.

BY JIM DUFFY

Islandia, N.Y.

backups.

Computer Associates International, Inc. (CA) last week brought distributed systems management capabilities to Windows and OS/2 work stations and servers with the introduction of CA-Unicenter/Star.

CA-Unicenter/Star allows systems administrators to monitor and analyze CA systems management servers concurrently through the same window on an OS/2 or Windows workstation. From these workstations, administrators can delegate specific systems management tasks, such as initiating unattended data backup or implementing security parameters for particular network domains, to different CA-Unicenter servers around the network.

The new software represents another attempt by CA to stake its ground in the market for systems management tools for distributed, client/server environments. CA, traditionally a developer of software for IBM mainframes, took its first stab at the client/server market this year with the introduction of CA-Unicenter/125, which runs on Unix-based minicomputers from Hewlett-Packard Co. (NW, May 31, page 17).

"CA is thick in the battle for leadership in distributed systems management," said Jay Yesselman, director of systems strategies at CA.

CA-Unicenter/Star is a client/server package where the client portions run on Windows and OS/2 workstations, and the server software runs on IBM MVS, OS/2, Unix and Novell, Inc. NetWare servers in a distributed network.

The software supports protocols and interprocess communications mechanisms native to the server's environment, such as LU 6.2 for IBM MVS mainframes, Internet Packet Exchange (IPX) for NetWare

Distributed authority 1) IBM MVS mainframe reports to workstation that disk space is reaching capacity Communications 2) Workstation 3) Console also reports it to CA-Unicenter/Star CA-Unicenter/ workstation on Star console, NetWare LAN to which tells the implement LAN local console to security policies to initiate thwart hackers scheduled

servers and Transmission Control Protocol/Internet Protocol for Unix systems.

Users can customize the graphical user interfaces of OS/2 and Windows workstations with pull-down menus and choice boxes that display only the systems management functions they are interested in. Users can also display managed servers as icons.

When an icon is activated, the systems administrator is presented with a list of available systems management functions, such as job scheduling, establishing user identifications and security parameters, and file management tasks. By clicking on a specific function, like user IDs, the administrator gains access to information on users authorized to work on the server from the server's SQL database.

See CA, page 14

GDC unveils interface for **ATM** switch

BY MAUREEN MOLLOY

Middlebury, Conn.

General DataComm, Inc. (GDC) announced a High Speed Serial Interface (HSSI) module that lets its ATM switch support speeds as low as T-1 for connecting to devices such as routers and mainframe channel extenders.

Most Asynchronous Transfer Mode (ATM) switches provide wide-area net interfaces from a T-3 rate of 45M bit/sec up to Optical Carrier-3 Synchronous Optical Network speeds of 155M bit/sec. But GDC's HSSI module lets the firm's Apex ATM switch support speeds between 1.5 and 52M bit/sec.

Besides enabling the switch to support a variety of existing data communications equipment, the module lets Apex switches connect to each other via high-speed inverse multiplexers. That

means users can build fractional T-3 and T-1-based ATM backbones without the high cost of dedicated T-3 facilities.

StrataCom, Inc. this summer also unveiled a 1.5M bit/sec ATM interface card for its IPX and Broadband-IPX fast packet switches, freeing the market for ATM nets to users that cannot cost-justify a full T-3 interconnect to an ATM network

GDC's Apex switch can be configured as a local-area network hub, a high-speed backbone router or as a WAN switch. It comes in 3.2G and 6.4G bit/sec versions and features a crosspoint switching matrix that supports a total of 64 ports.

HSSI, which was recently established as a formal standard, is a physical interface specification that supports speeds from 1.5M to 52M bit/sec. Previously, serial port connections between data terminal equipment and data communications equipment slowed transmission speed to under 4M bit/sec.

The GDC Apex HSSI costs \$3,000 and will be available in January.

©GDC: (203) 574-1118.

BRIEFS

Data Connection, Ltd. (DCL) last week announced that six new vendors had licensed its Advanced Peerto-Peer Networking (APPN) source code for implementation in their products.

Cabletron Systems, Inc., Hewlett-Packard Co., Hitachi, Ltd., Memorex Telex, Northern Telecom, Inc. and Unisys Corp. joined with Wellfleet Communications, Înc. as the first seven companies to implement DCL's SNA-APPN source code. DCL is the only vendor other than IBM to issue APPN software licenses. All of the vendors promised to deliver products implementing APPN by the end of next year.

Continued sluggish mainframe sales and dismal European sales were among the reasons IBM last week reported a loss of \$70 million for the third quarter. IBM had revenues of \$14.7 billion, almost

identical to 1992's third quarter.

Analysts said the U.S. mainframe business actually has improved slightly since June, but that heavy discounting and other pricing conditions have deteriorated the mainframe's cash-cow posi-

IBM makes about 40% of its sales in Europe,

where sales have been slow for all products.

RAD Network Devices, Inc. (RND) has announced price cuts of up to 23% on several of its internetworking products, including all models of its Remote Token Ring Bridge. The bridge now has a base price of \$3,995 for one wide-area network line, \$4,495 for two WAN links and \$7,495 for four links.

Additionally, RND reduced the cost of its singleattached Fiber Distributed Data Interface module for its OpenGate router to \$6,250.

RND: (714) 891-1446.

Cayman Systems, Inc. has announced a development partnership with Livingston Enterprises, Inc. to jointly build and market remote network access products. The agreement will enable Cayman to offer a variety of remote access products for personal computer users in addition to its current AppleTalk Remote Access Server product, the GatorLink.

Cisco Systems, Inc. and France Telecom announced they have demonstrated interoperability between their respective frame relay and Integrated Services Digital Network products and services, which were tested with a distributed database and local-area network interconnection application running between the U.S. and France.

Companies ready CDPD modems

BY ELLEN MESSMER

Washington, D.C.

It's a big week for Cellular Digital Packet Data (CDPD) as Cincinnati Microwave, Inc. and Pacific Communications Sciences, Inc. (PCSI) each announced plans today to ship CDPD-compliant external modems early next year.

Cincinnati Microwave will ship the MC-DART 100, a 12-ounce wireless, 19.2K bit/sec CDPD modem for mobile data communications. PCSI is offering the Ubiquity 2000, a 1.8-pound multipurpose modem for use not just with CDPD, but with circuit-switched cellular, facsimile and wire-line services, as well.

CDPD is a de facto standard for transmitting digital packet data at up to 19.2K bit/sec using cellular frequencies. It is expected to be deployed by at least eight cellular carriers by year end.

With the Cincinnati Microwave MC-DART 100, users get a "plain vanilla" CDPD modem expected to sell for \$495, and less for bulk quantities.

The half-duplex MC-DART 100 modem plugs into a standard RS-232 serial interface and uses an ATcompatible command set for sending and receiving data over a CDPD net.

In the future, Cincinnati Microwave is expected to build CDPD modems into PCMCIA cards for use with the burgeoning number of personal digital assistants on the market.

PCSI, based in San Diego, has taken a different approach with the Ubiquity 2000 CDPD modem it will ship next March.

Because full CDPD coverage will probably not happen immediately, PCSI has reasoned that users will want a modem capable of handling a variety of circuit-switched cellular and wire-line protocols.

Like Air Communications, Inc., which has taken a similar tack with its wireless modem (see story, this page), PCSI has built the Ubiquity 2000 to support modem protocols other than CDPD.

The Ubiquity 2000, which works with any MS-DOS-based computer, also supports the V.22bis, V.23, V.32bis, V.42bis, Group 3 fax and V.17 wire-line fax and data protocols, plus the cellular Microcom, Inc. Network Protocol 10.

That means the Ubiquity 2000 can support transmission speeds of up to 57.4K bit/sec over cellular and, with data compression, effective throughput of over 57K bit/sec.

However, unlike Air Communications' device the Air Communicator, which can automatically identify the modem on the receiving end and adjust accordingly — the Ubiquity 2000 has to be preset for call connection.

The Ubiquity 2000 can be used as a cellular phone by simply plugging a cellular voice handset into the unit. When used as an analog cellular phone, the unit can sustain about 1.5 hours of talk time. For CDPD transmission, the modem is benchmarked for 2.2 hours of constant transmission and receiving.

The Ubiquity 2000 is expected to cost \$1,495, which includes a battery, battery charger, and communications software for Windows and MS-DOS.

PCSI has also announced plans for an internal CDPD modem, the Ubiquity 1000, to ship before the end of the year. Costing \$1,495, it fits inside the new IBM ThinkPad 750 notebook computer.

©Cincinnati Microwave: (513) 247-4540; PSCI: (619) 535-9500.

Start-up intros modem

Air Communications, Inc., a mobile products start-up here, last week introduced the Air Communicator, a combined cellular phone and wireless facsimile/modem that also works with wire-line systems.

The Air Communicator is the first wireless peripheral to support multiple modem protocols and utilize V.42bis data compression to achieve data rates up to 57.6K bit/sec over both standard cellular links and land lines. Weighing in at 16 ounces, the device doubles as a portable cellular phone and is about the same size.

"We designed the [Air Communicator] from the ground up to send data at high speed," said Air Communications President and Chief Executive Officer Kevin Surace.

The Air Communicator plugs into the serial port of any Apple Computer, Inc. Macintosh, Windows- or MS-DOS-based machine, letting users connect to cellular or telephone links.

The device's software can work with modems based on Microcom, Inc.'s Network Protocol 10 or the AT&T Paradyne Enhanced Cellular Throughput protocol. The Air Communicator works with Group 3 fax and can attain V.42bis data compression rates when communicating with regular modems.

"[Nothing] on the market comes close to what Air has done," said Lynda Fitzpatrick, data communications analyst at International Data Corp. in Framingham, Mass.



Surace of Air Communications

The company plans to ship the Air Communicator by year end. It is expected to retail for \$1,495.

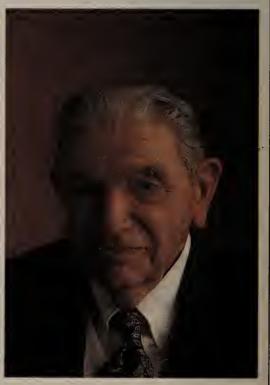
Air Communications: (408) 749-9883.

BY ELLEN MESSMER









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NWN5











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call 1-800-RACAL-55.







Vendors jockey for platform to manage SNA, TCP/IP nets

Users may not benefit now but see a need down the road.

BY JIM DUFFY

Vendor

Integrated SNA/SNMP management platforms promise to reduce the cost and complexity of managing enterprise networks, even though current systems fall short of true integration, according to users and industry observers.

Platforms offered by companies such as Hewlett-Packard Co., SunConnect, IBM, MAXM Systems Corp., Nynex Allink Co. and Peregrine Systems, Inc. feature varying levels of integrated Systems Network Architecture and Simple Network Management Protocol management.

Capabilities

Others lack the ability to store SNA and SNMP information in a single database accessible through a single set of calls.

But that's OK, analysts say, because most users are not quite at the point where they can benefit from this level of integration because they are still trying to integrate their SNA and multiprotocol internetwork environments.

"Until we have a true multiprotocol backbone, what we'll have [as far as management integration] are disjointed environments,' said John McConnell, an independent consultant based in Boulder, Colo. "So a lot of integration currently doesn't buy you anything."

	Cystoni	
	Hewlett-Packard Co. OpenView	SNA Node Manager performs automatic discovery and gathers status of SNA, SNMP nodes. Commands can be sent directly to VTAM and/or NetView.
	SunConnect SunNet Manager	SunLink SNA applications allow NetView users to view SNMP traps gathered by SunNet Manager and send commands to it. SNA-Expert application forwards SNA alarms to SunNet Manager via LU 6.2. Allows SunNet Manager to issue commands back to NetView.
	IBM NetView/6000	Automatic discovery and fault, configuration and performance management of SNMP nodes, including data on likely cause of problem and recommended actions. SNA/6000 application can pull user-defined data from NetView via LU 6.2. SNA management capabilities planned.
	Peregrine Systems, Inc. Peregrine Network Management System	Automatically opens and closes trouble tickets based on SNMP and NetView alerts. Dynamically creates and updates inventory database with TCP/IP and SNA topology.
	MAXM Systems Corp. MAXM	SNA and SNMP support, including bidirectional NetView service point interface. Translates non-SNA management information, including SNMP data, into NetView alerts. Translates NetView commands into SNMP messages. Supports terminal emulation to access SNMP element managers.
	NYNEX Allink Co. Allink Operations Coordinator	Interfaces to NetView and SNMP element managers, including SunNet Manager. Reports failure of elements and impact on the rest of the network.

Head-to-head in integrated SNA/SNMP management

While not all provide "true" integrated management — whereby both SNA and multiprotocol internets are shown on a single map and events are correlated between the two the systems are positioned as single points of control for both environments.

GRAPHIC BY SUSAN J. CHAMPENY

HP, for example, recently licensed software from Peregrine as the basis for an HP-branded application that lets users govern IBM Systems Network Architecture environments from an OpenView console. HP already has a homegrown application, called Network Node Manager, that manages Transmission Control Protocol/Internet Protocol networks using SNMP.

And last week, SunConnect announced that Alcatel Bell ITS of Belgium developed an application for SunNet Manager that allows the system to automatically discover SNA nodes, represent them on a topological map, and receive and filter SNA alarms.

IBM, meanwhile, is developing SNA/6000, an application that will let users of its Net-View/6000 SNMP console pull data from a Net-VIew host and display it on a NetView/6000 screen. And Peregrine, MAXM and NYNEX Allink have systems that offer varying levels of database integration, alarm and event handling and automated trouble ticketing for SNA and SNMP networks (see graphic, this page).

While that represents a step in the right direction, analysts say these platforms still lack "true" integrated management of SNA and SNMP networks.

Some lack the ability to plot both networks on a single map, show nodes that might have two addresses and correlate how an event on one network affects resources on the other.

That being the case, current forays into integrated SNA/SNMP management are viewed by users and analysts as stepping stones to tighter, more functional integration that will coincide with the larger network integration effort.

SOURCE: NETWORK WORLD

"We can reduce the number and complexity of the tools that net managers have to use," said Paul Edmunds, senior IS analyst at Duke Power Co. in Charlotte, N.C. "We have a lot of different people managing our network now that are split between IP management and SNA. Those two groups need to come together at some point.'

US West Advanced Technologies, Inc. sees integrated management as a way to quickly drill down to the source of an SNA and/or SNMP problem, said Rick Sturm, a member of the technical staff at the company.

"It gets us to the point where we can then start to do automated reponses to alarms, alarm correlation, looking at problems end-toend," Sturm said. "It isn't even enough to be able to see the whole network. You need to see from the application down into the workstation and be able to analyze and identify root causes [of faults]."

Loral Corp. plans to size up HP's method for integrated SNA/SNMP management as a result of the vendor's licensing arrangement with Peregrine. But the company realizes there are some downsides to the integrated approach that many vendors are not yet addressing.

''Integrated management only makes sense if you can take all of the inputs from the different subnetworks and systems and get rid of the superfluous stuff," said Daniel Scharre, director of communications systems at Loral. Z

Proginet to meld OSI, TCP/IP

BY MICHAEL COONEY

Uniondale, N.Y.

Proginet Corp. last week announced new features for its Open Systems Interconnection FTAM program that will let users more easily link LANs with OSI applications on IBM and compatible mainframes.

The company announced that its Host.File Transfer, Access and Management (FTAM) software will support IBM's local-area network-to-mainframe channel gateway, the 3172 Interconnect Controller. That will let users access mainframe-based Open Systems Interconnection applications from Ethernet, Token-Ring or Fiber Distributed Data Interface LANs without requiring the use of an expensive front-end processor or IBM OSI mainframe software.

"All FTAM communications currently go through a front-end processor, but we eliminate that requirement and let users bring LANs directly to FTAM applications on the mainframe," said Joe Mohen, chief technical officer with Proginet

Host.FTAM lets IBM MVS mainframe users share files with other FTAM-compliant platforms without requiring the use of IBM's OSI/Communications Subsystem (OSI/CS)

OSI/CS runs on IBM's MVS, VM, OS/400 and OS/2 platforms, implements OSI Layers 3 through 7 and provides links to other OSI nets and services.

Proginet also announced a statement of direction to support the Internet Engineering Task Force Request For Comment 1006, which defines how OSI applications can run over Transmission Control Protocol/Internet Protocol nets.

The company will support this feature via the 3172's TCP/IP off-load function, which moves TCP/IP protocol processing from the mainframe to the 3172.

"With a direct mainframe channel link, we are giving users a high-bandwidth pipe they can use for high-speed OSI file transfers among different systems," Mohen said.

The central component of Host.FTAM is its Open System Server, which provides file queuing, error monitoring and file tracking features. Other FTAM systems — such as those from Novell, Inc., Digital Equipment Corp. and Tandem Computers, Inc. - become clients to the Host.FTAM system. Users can monitor the file transfer from their central MVS

The software supports real-time, bidirectional connections and unattended file transfers, and lets users schedule file transfers for transmission during off-peak periods.

Both new features will be incorporated into the next release of Host.FTAM and will be made available for no charge to existing customers. Host.FTAM, which runs on MVS Version 4 or above, is available for \$85,000.

© Proginet: (516) 228-6600.

Continued from page 11

packet's destination and handle it accordingly. RTP, meanwhile, will provide pacing — or flow control - and error recovery for APPN/HPR data. It will sense net congestion or outages and reroute the data around the problem fast enough that the session is not lost.

It also contains the same class-of-service and priority level awareness that exists in traditional Systems Network Architecture nets.

Today's APPN nets use adaptive pacing for data flow control, which lets each intermediate NN slow or speed data as it crosses the net.

Within RTP, a feature called Adaptive Rate-Based (ARB) congestion control handles error recovery and data flow control end-to-end rather than at every node, obviating the need for that chore to be done at each node and

reducing memory requirements. Plus, ARB automatically senses traffic buildup and will prevent congestion in the net by slowing data transfers at the periphery of the net rather than reacting to congestion after it occurs.

RTP also supports an error recovery feature whereby, in applications such as file transfers, only lost packets are retransmitted, saving net bandwidth. Today, if packets are lost during transmission, the whole file is retransmitted.

Another key feature of HPR is that it will not have to be implemented on every APPN node in the net. HPR is backward-compatible with ISR and can operate in a mixed ISR/HPR net. Users can add HPR to as little as two or three NNs to see performance and congestion control improvements, IBM said. As soon as two or more adjacent nodes are HPR-capable, nondisruptive rerouting, congestion control and HPR's other features can be utilized between those nodes, the company said.

CA

Continued from page 11

The administrator can then enter in new user IDs or delete old ones. When the icon is closed, the CA-Unicenter/Star database is automatically updated with the new information.

With CA-Unicenter/Star, users can distribute systems administration functions to CA-Unicenter servers across the entire network based on application requirements. For example, an autonomous business unit can be granted authority to schedule its own processing tasks, while a centralized MIS group manages such things as inventory.

Users said CA-Unicenter/Star will help consolidate access to enterprisewide systems management capabilities on a single console.

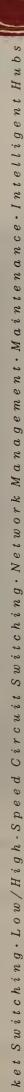
''It was necessary to have different worksta-

tions [acting as CA-Unicenter consoles] for different operating systems," said Ray Murray, computer operations manager at Chesebrough-Pond's Co. in Greenwich, Conn. "Star will provide consolidation of access to that

CA-Unicenter/Star also features a macro language, called CA-Basic Language Engine that lets users build customized applications for automating repetitive operations. The software also lets administrators write customized management reports for analyzing and forecasting systems activity.

CA-Unicenter/Star costs \$1,000 for the client piece, \$1,000 for OS/2 and NetWare servers, and \$15,000 for an MVS server. Prices for Unix servers have not yet been established. CA expects to ship the software in the first half of

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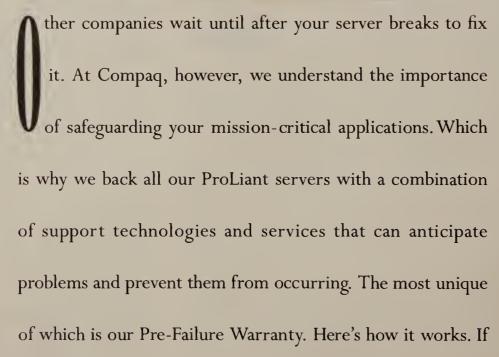






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LOCAL NETWORKS

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BRIEFS

NCR Corp. last week brought out bridge and router modules for its SmartHub XE Ethernet wiring hub. The router module, called the Star-WAN Model 120, was codeveloped by NCR and Cisco Systems, Inc. It can route Transmission Control Protocol/Internet Protocol, Open Systems Interconnection, Digital Equipment Corp.'s DECnet, Xerox Corp.'s Xerox Network Systems, Novell, Inc.'s Internetwork Packet Exchange (IPX), Banyan Systems, Inc.'s VINES and Apple Computer, Inc.'s AppleTalk protocols. It can also bridge nonroutable protocols, such as DEC's Local Area Transport protocol. The SmartHub XE Ethernet Bridge Module supports the Spanning Tree standard, flash memory for software downloads and storage, and a software controlled A/B port for receiving and trans-

The StarWAN Model 120 costs \$4,195 and is available now. The SmartHub XE Ethernet Bridge Module costs \$3,795 and will be available in December.

NCR: (513) 445-5000.

The AG Group, Inc., based in Walnut Creek, Calif., has released TokenPeek 2.0, a new version of its Apple Computer, Inc. Macintoshbased token-ring network analyzer.

TokenPeek 2.0 runs on a Macintosh II or higher machine, captures statistics about net traffic, pinpoints problems, identifies configuration bottlenecks and tests network hardware under varying loads. The new version lets net managers track specific packets on the net and produces graphs outlining their activity. Token Peek 2.0 also supports Digital Communications Associates, Inc.'s MacIRMAtrac adapters.

TokenPeek 2.0 is available immediately and

The AG Group: (510) 937-7900.

Allied Telesis, Inc. last week at the INTEROP 93 Europe trade show in Paris introduced Version 2.0 of its 16-bit Ethernet network interface card software. It will include a Simple Network Management Protocol agent supporting the Management Information Base II standard as well as an industry-standard Transmission Control Protocol/Internet Protocol stack with application program interfaces (API) conforming to the Windows Sockets and Network Basic I/O System standards. These APIs allow third-party software programs to be used with the adapters.

Version 2.0 will be included on all new adapts starting on Dec. 1.

Allied Telesis also rolled out three new Ethernet hubs that support SNMP. The AT-3606F hub has six Fiber Optic Inter Repeater Link (FOIRL) ports and a backbone connection that can be configured as an attachment unit interface, BNC, unshielded twisted-pair or FOIRL port. Available now, the hub costs \$3,195. The AT-3608 has eight 10Base2 Ethernet ports and a modular backbone connection with the same options as the AT-3606F. Also available now, it costs \$2,795. The AT-3612TR is a 12-port hub with RJ-45 connectors that also offers the backbone port. Available now, it costs \$1,795.

Novell's Embedded **NetWare to find a home**

Technology to go where no LAN has gone before.

BY CARYN GILLOOLY

Monterey, Calif.

Novell, Inc. is quietly developing new technologies that will ultimately bring Net-Ware to your home.

According to Novell officials, the company will map out by February a plan for what has been dubbed Embedded NetWare, a set of technologies for building network capabilities into devices and places that previously stood alone.

Under the plan, Novell will first work to tie point-of-sale systems directly into corporate networks. Novell also will map out a longer term vision for the Smart Home: a home in which electronic devices from television sets to heating systems can be accessed by the corporate networks, as well.

> The Smart Home would affect almost everyone - providing new conveniences to ordinary homeowners and potentially massive cost savings for utility companies and other firms that provide services to the

> Some observers cite Novell's plan as a direct response to Microsoft Corp.'s recently

released Microsoft at Work plan. However, Microsoft's plan centers primarily around connecting various office devices — such as photo copiers and fax machines — and is based on Windows.

NEAR-TERM NETWORKING

In the near term. Embedded NetWare will be used to tie together those parts of a user's business that NetWare has yet to reach, said Darl McBride, vice president and general manager of Novell's Extended Networks Group in Monterey, Calif.

More specifically, Novell wants to tie NetWare into FlexOS, which is multitasking, multiuser software that Novell offers as a point-of-sale operating system. Novell inherited FlexOS, which is used in electronic cash registers and other devices, through its acquisition of Digital Research,

"There's a big opportunity to connect those [FlexOS-based] systems into NetWare, so part of what we're doing is to bring these two environments together," McBride said.

Although he would not provide details on how FlexOS and NetWare will meet, McBride said that by tying a POS system into the corporate net, users could more eas-See Novell, page 24

HP ups the ante on server power...

BY CHRISTINE BURNS

Palo Alto, Calif.

Hewlett-Packard Co. this week will roll out several new symmetric multiprocessing (SMP) servers with the power to run mainframe applications in client/server environments.

New models of HP's Unix-based HP 9000 and MPE/iX-based HP 3000 Corporate Business Systems servers will range from supporting one to 12 processors and feature HP's newest Reduced Instruction Set Computing processor, the 90-MHz Precision Architecture-7100 (PA-7100).

"This is the next step in our Slim-Fast diet plan for the mainframe," said Rich Sevcik, general manager of HP systems and servers group. Sevcik said the processing power of the new servers will allow companies to migrate applications from expensive mainframes to less costly, more efficient server-based sys-

The new servers in the HP 3000 line range from supporting one to eight PA-7100 processors and are referred to as the Series 995 models.

The new server in the HP 9000 series is the Model T500, and it accommodates one to 12 PA-7100

Sevcik said these new servers significantly raise the performance bar for the current HP Corporate Business Systems line. In an in-house test, the new eight-way SMP HP 9000 Model T500 server running Oracle Corp.'s Oracle7 database achieved more than 1,500 transactions per second, compared to a previous high of 700 transactions per second on an existing four-way SMP HP 9000 Model 890 unit.

See Servers, page 23

HP serves up servers to Chevron

Chevron Corp. announced last week that it will switch from its 30-year-old IBM mainframe-based financial system to a client/server environment based on HP 9000 servers and SAP America, Inc.'s R/3 System financial software. The migration will take 5 years and begin at Chevron's Warren Petroleum subsidiary in Tulsa, Okla.

GRAPHIC BY SUSAN J. CHAMPENY

The HP JetDirect EX

The adapter supports any printer with a parallel port, including the new low-end models HP announced last week. The HP LaserJet 4P and the HP LaserJet 4MP machines both contain RISC processors that offer 600 dot/inch printing at a rate of 4 pages per minute. Both printers are available immediately and cost \$1,229 and \$1,729,

> SOURCE: HEWLETT-PACKARD CO., PALO ALTO, CALIE GRAPHIC BY SUSAN J. CHAMPENY

respectively.

... and opens the door for more printers

BY CHRISTINE BURNS

Palo Alto, Calif.

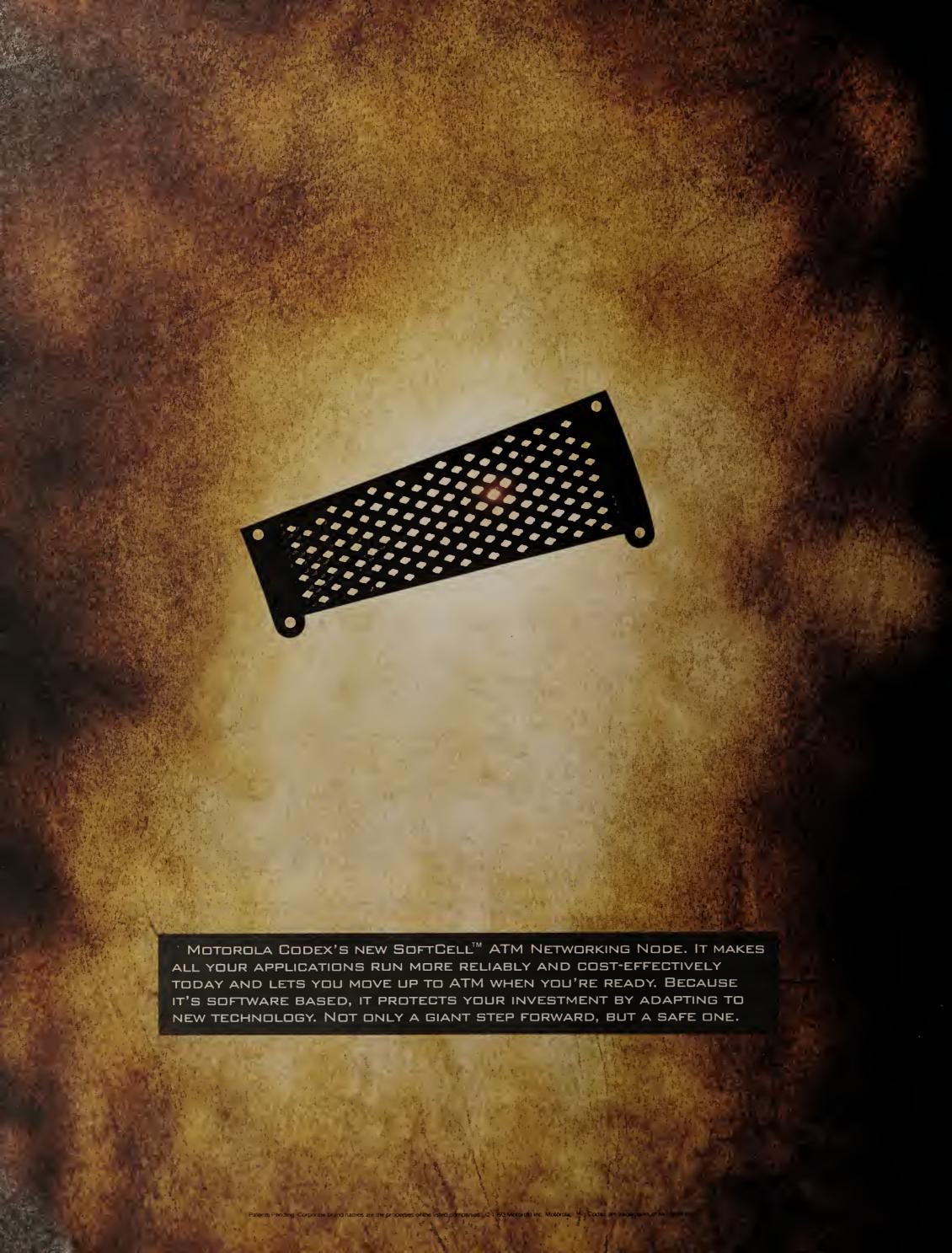
Hewlett-Packard Co. last week released the next generation of its JetDirect EX printer adapter cards, which allow printers to be integrated into multivendor local-area network environments.

The new JetDirect EX external adapters support four transmission protocols and 11 types of network operating systems (NOS). Previously they only supthe Internetwork change/Sequenced Packet Exchange (IPX/SPX) protocol stack for use in Novell, Inc. NetWare LANs.

While the old adapters were only for HP printers, the new adapters will connect any printer with a standard parallel port to either a token-ring or Ethernet network, and support Data Link Control/Logical Link Control (DLC/LLC), Transmission Control Protocol/Internet Protocol and Apple Computer, Inc. Ethertalk protocols.

This added protocol support enables networked printers to handle print jobs sent from Microsoft Corp. LAN Manager, Windows for Workgroups and Windows NT systems; IBM LAN Server and Unixbased AIX machines; Sun Microsystems, Inc. SunOS and Solaris systems; and The Santa Cruz Operation, Inc. Unix, HP-UX and networked Macin-

C.J. Meiser III, senior marketing analyst with BIS Strategic Decisions in Norwell, Mass., said users will not likely use the JetDirect EX to provide print services for all 11 different operating system environments simultaneously. "But it will save some money because they'll only have to buy a single adapter card See Printers, page 23





Trakker gains capabilities

BY SKIP MACASKILL

Marlborough, Mass.

Concord Communications, Inc. last week released a new version of its network management software that lets administrators better plot LAN configuration changes by simulating potential traffic patterns and loads.

Trak/Report 2.0, which runs on Concord's Unix-based Trakker network monitoring platform, also features faster performance, better database management and new support for token-ring networks. Previously, Trak/Report only worked on Ethernet

Trak/Report captures packets, compiles a host of network information in an Ingres relational database and provides net managers with an SQL-based report generator and graphical display features to view and manipulate the

Trak/Report now offers a local-area network capacity planning feature that allows net managers to simulate moves, adds and changes for single users or logical groups of users. Based on real-time traffic and communications trends, as well as historical patterns stored in Trak/Report's relational database, the application can determine what the new net configuration should be to achieve optimal performance.

Trak/Report's new capacity plan-

ning function builds on an existing what-if analysis capability that enables net managers to experiment with different network designs to optimize performance and plan for future network growth as user requirements change. The major difference between this and the new capacity planning feature is that the what-if capability is based largely on hypothetical situations, whereas the new capacity planning feature is based on real-time information.

Concord has also improved the performance of the Trak/Report by speeding access to the Ingres database and adding a historical data compression feature.

Faster access to the database means that Trak/Report can generate reports based on the information it captures in minutes rather than hours. The database compression makes better use of available database storage capacity by discarding less essential information on old network activity to make room for more details on the most recent network traffic.

Trak/Report Version 2.0 will also synchronize the historical database with the network topology as it changes, so that historical data remains relevant to the current network design.

Available next month, Trak/Report 2.0 costs \$7,500.

©Concord: (508) 460-4846.

Vendor trio airs new products, enhancements

BY CARYN GILLOOLY

Mountain View, Calif.

Wireless local-area networking just got a boost as three of the leading vendors in the market have introduced additions to their product lines.

Topping the list, Proxim, Inc. will partner with MODA Systems, Inc. under which the companies will combine their products to bring wireless connectivity to Application System/400 customers.

Last month, Wi-LAN, Inc. introduced a family of 20M bit/sec Ethernet products, while InfraLAN Technologies, Inc. added Ethernet support to its products.

Proxim offers a host of wireless LAN adapters, including RangeLAN/PCMCIA for portable devices, RangeLAN/ISA for desktop personal computers, RangeLAN/Parallel for parallel-port connections and RangeLAN/Roaming for mobile computer users on Novell, Inc. NetWare LANs.

Through its agreement with MODA, Proxim will integrate its RangeLAN family of wireless LAN adapters with Via/400, MODA's wireless connectivity software for the IBM AS/400. Together, the products will let mobile users access applications on AS/400s.

"By combining our strengths, Proxim and MODA can now provide a fully integrated wireless LAN solution to link portable and pen computers to AS/400based corporate information systems," said David King, president and chief executive officer at Proxim, based here.

Pricing and availability for the integrated products

Vendors show new wireless wares							
Company	Product	Pricing	Availability				
Wi-LAN, Inc.	Wi-LAN 902-20	\$1,495	January				
InfraLAN Technologies, Inc.	infraLAN Cableless LAN (Ethernet version)	\$1,025	Now				
Proxim, Inc.	Integration of Proxim's wireless LAN adapters with MODA Systems, Inc.'s Via/400	Not available	Not available				
GRAPHIC BY SUSAN SLA	SOURCE: NETWORK WORLD						

has not yet been determined.

Wi-LAN is focusing on providing faster wireless desktop connectivity, rather than connecting mobile users, with the release of Wi-LAN 902-20.

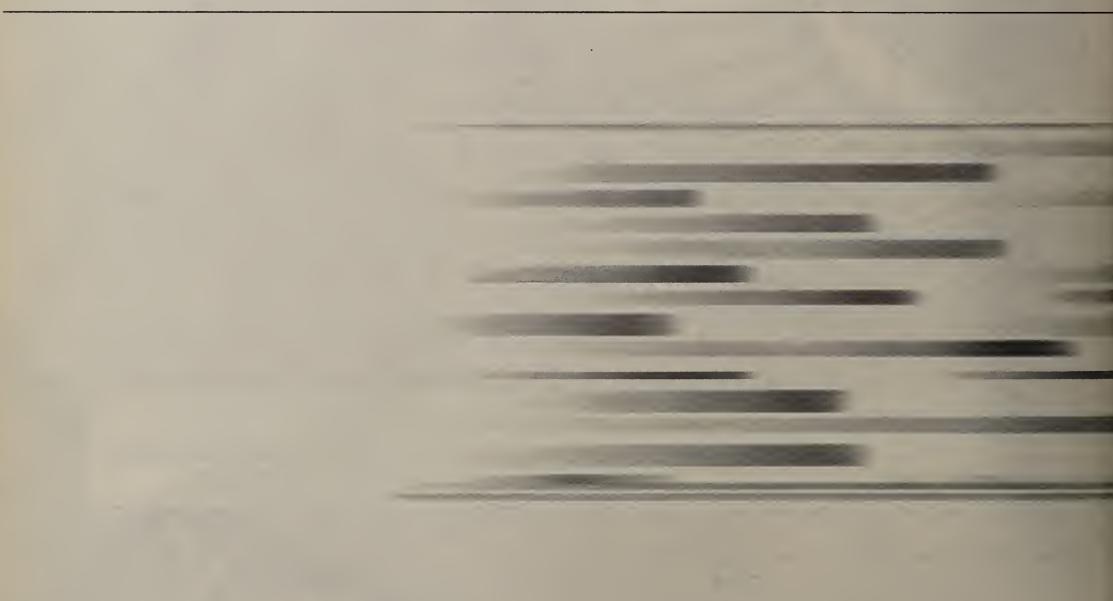
This product is a hardware device that attaches to any Ethernet adapter on a PC or workstation. It accepts outgoing data from the adapter, modulates and compresses it, then transmits it at 20M bit/sec to any other PC or workstation that also has a WiLAN 920-20 device attached to its Ethernet adapter.

The Wi-LAN 902-20 will be available in January for \$1,495. According to the firm, based in Calgary, Alberta, a token-ring version of the product is expected to be available in the second quarter of 1994.

InfraLAN, based in Acton, Mass., released an Ethernet version of its InfraLAN Cableless LAN hardware. This new version provides wireless 10M bit/sec transmission rates through an RI-45 or attachment unit interface connection to any Ethernet device. Previously, the product only supported token-ring connections.

The InfraLAN Cableless LAN system is available now at \$1,025.

©InfraLAN: (508) 266-1500; Proxim: (415) 960-1630; Wi-LAN: (403) 273-9133.



Servers

Continued from page 19

Sheldon Altman, president of Saans Stores, a chain of 265 clothing stores in western Canada, is moving all of the company's disparate retail applications to an HP 9000 Model T500. Currently, the retailer runs its applications on a mainframe and performs other tasks man-

"We're really not concerned about the

Printers

Continued from page 19

that fits the two or three NOSes they do run," Meiser said.

Central to the multiprotocol support is firmware embedded in the JetDirect cards. The firmware contains the IPX/SPX, TCP/IP, DLC/LLC and Ethertalk protocol stacks and automatically selects the appropriate stack with each print job it receives.

The cards are also shipped with Simple Network Management Protocol agents, which allow SNMP-based management systems to collect printer status information, such as when a printer is out of paper or low on toner.

The JetDirect EX Model J2382B for Ethernet and Model J2383B for token ring cost \$499 and \$699, respectively. HP will also offer upgrade packages for previous JetDirect EX adapters for \$50. Both the cards and the upgrade package will be available Nov. 1.

©HP: (800) 752-0900.

speed of the bits and the bytes of this thing," Altman said. "We bought it because it's got the power to help us integrate all of our retail operations, from our back-room records keeping, like payroll and the general ledger, to things like inventory tracking that is done manually right now."

In addition to more processing power, a new feature of the HP 9000 Model T500 is its expanded fault-tolerance options, including support for fast and wide Small Computer System Interface-2 disk arrays. This SCSI-2 disk array supports Redundant Array of Inexpensive Disks Levels 3 and 5 fault tolerance.

NEW FEATURES

New features of the HP 3000 servers include support for Storage Technology Corp. 3480-compatible tape backup units for reading and writing IBM 3480/90 tapes as well as support for IBM Adstar backup and archiving products.

Also, the new systems will support HP's 3000 VA PowerTrust uninterruptible power supply devices.

The HP 9000 Server Model T500 with one to eight processors is available immediately, while models containing nine to 12 processors will ship in the first quarter of 1994. Server prices range from \$165,000 for one processor to \$660,000 for 12 processors.

The new HP 3000 servers will be available in the first half of next year with prices ranging from \$259,300 for the entry-level Series 995/100 system with a single processor to \$679,300 for the eight-way SMP Series 995/800.

©HP: (800) 637-7740.

Alantec, Network General unite hub, net analyzer

The integration

of PowerHub

and DSS will

allow users to

perform expert

analysis.

BY SKIP MACASKILL

Users with Alantec, Inc.'s switching hub got a net management boost last week when the company announced it will integrate and jointly market its PowerHub system with Net-

work GeneralCorp.'s network

protocol analyzers.

Combining the PowerHub with Network General's Distributed Sniffer System (DSS) network analysis tool will give Alantec users a view of multiple Ethernets and Fiber Distributed Data Interface rings from a single

DSS is a personal computer-based network analyzer that runs Network General's Expert Sniffer software and performs automatic problem identification, global name learning of all end stations attached to the enterprise net and analysis of over 140 protocols.

"With a single DSS, users now have the capability to view every Ethernet net and subnet connected to the PowerHub from one central location [using] a single port on the [hub]," said Michael Cartsonis, product marketing manager for DSS console and integration at Network General. "Users will no longer have to physically move a net analyzer from one net segment to another to compile management information on the network.

DSS can be attached to a single port on the PowerHub designated as a monitoring port. As traffic enters the PowerHub, it will automatically be switched to both its destination address and the DSS port, where the network analyzer can peruse the traffic.

> Alantec's store-and-forward switching hub architecture provides for PowerHub to capture packets, copy them and forward them to the monitoring port, said Paul Dezan, a product line manager at Alantec.

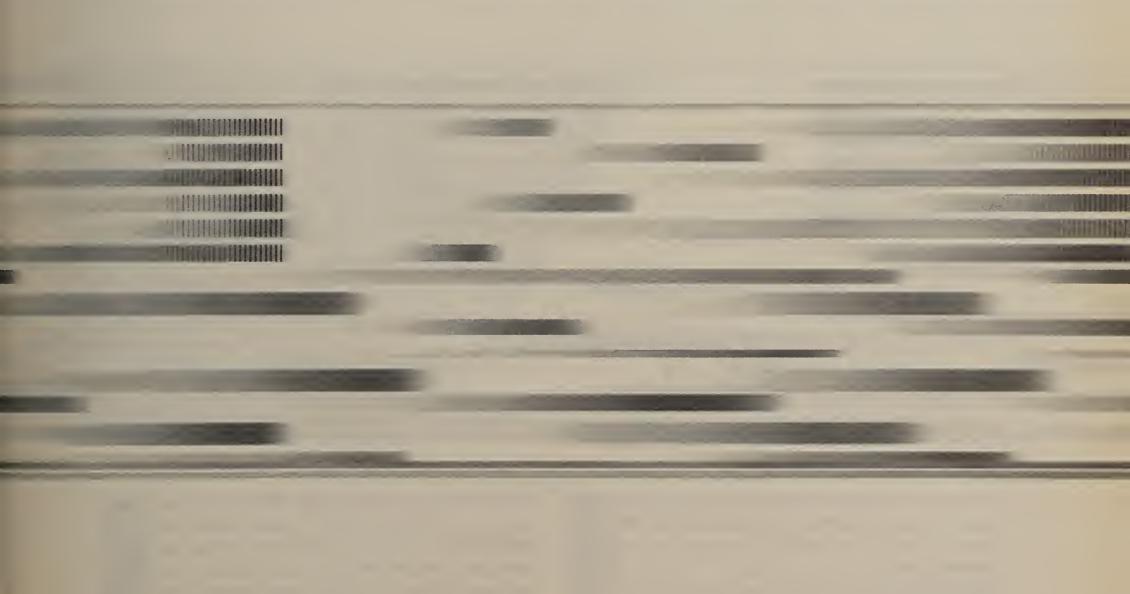
> "Some of our competitors, such as Kalpana, Inc., cannot offer this capability because

their boxes use a cut-through switching approach that merely looks at the address header before switching the packet," he said.

The integration of PowerHub and the Network General products will allow users to perform expert analysis on the two FDDI backbones and 12 Ethernet segments supported by the PowerHub.

'Users will not only gain a simultaneous view into multiple net segments, but they will also gain a cost benefit by eliminating the need to send net technicians [equipped with network analysis gear] to each segment's physical location," Cartsonis said.

©Alantec: (408) 955-9000; Network General: (415) 473-2000.



Pyramid rolls out SMP version of NetWare

BY CARYN GILLOOLY

San Jose, Calif.

Multiprocessing: Asymmetric vs. symmetric

'a-sym-'met-ric 'mul-ti-'pro-cess-ing: a

function wherein processors in the same or

different systems are dedicated to specific

memory management. They off-load these

tasks from the main system CPU, which

tasks, such as disk I/O, network I/O or

Pyramid Technologies, Inc. is expected to bring symmetric multiprocessing (SMP) to Novell, Inc. NetWare users this week with the release of Pyramid NetWare SMP.

The new product is an enhanced verof sion Novell's Net-Ware for Unix that lets Net-Ware clients attach to a Pyramid superserver and take advantage of the speed and efficiency provided by the multiprocessing system.

NetWare for Unix is Novell's hardwareand processor-independent version of native NetWare that runs as an application on top of the Unix operating system. The product automatically maps client requests for file and print services to the Unix-based host. From the client perspective, access is transparent, as files and services appear as if they are on a native NetWare server.

NetWare for Unix is licensed from Novell

to other Unix vendors, which enhance the product to run on their platforms. Pyramid NetWare SMP, for example, runs on any Pyramid computer running the company's Data Center/OSx operating system.

Pyramid has configured the software fur-

ther to leverage the multiprocessing capabilities of the company's servers. This enables administrators to add Netway to integrate desktops into the company's Unix-based servers," said Norton Greenfeld, senior analyst at InfoCorp., a research and consulting firm in Westborough, Mass.

Yellow Technology Services, based in Overland Park, Kan., runs both NetWare 3.X as well as a 12-processor Pyramid server. According to Robert Sakmar, information research technology analyst at Yellow Technology, the initial reason for implementing Pyramid NetWare SMP was to be able to print information from applications on the server onto NetWare-based printers.

Now, Sakmar said, he also sees the importance of the SMP capabilities. "SMP is important because it lets [an application] share processors with others in the box," he said. "Otherwise, we'd have to dedicate specific processors for specific applications. We

wouldn't like to take an

expensive processor and dedicate it" to a specific application, he added.

Pyramid
NetWare SMP
is available in
four configurations: a 32-user
version for
\$9,000; a 64user version

for \$12,000; a 128-user version for \$16,000; and a 256-user version for \$20,000.

©Pyramid: (408) 428-9000.

Novell

Contiinued from page 19

ily give central and remote sites access to each other's

For example, a cash register tied into a corporate network could run an application to track the hottest selling products and forward the information it collects to a distribution center to automate the replenishment of those items.

Novell plans to announce a product set in this area by February, McBride said.

DOWN THE ROAD

Further into the future, Embedded NetWare will enable Novell to bring networking home, literally.

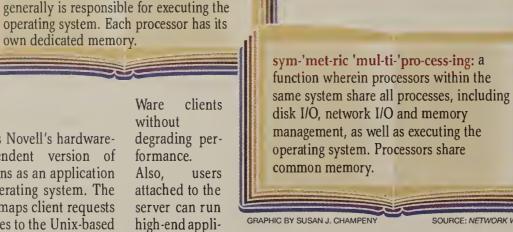
McBride said that in addition to desktop personal computers, users at some point will have "set-top" machines — computers next to or on top of their television sets that will connect to other devices in the home as well as to a corporate network.

Initially, Novell said it foresees customer homes tied directly into networks of companies such as utility firms that want to track demand for power.

"If [they could] track that, power companies would be able to save millions of dollars," McBride said. "If a Smart Home can understand that nobody's home, it would be able to automatically power-down electronic devices for energy efficiency."

Beyond this type of application, McBride said customers would some day be able to control devices in the home while away.

"People who spend a lot of time traveling would be able to connect into the home from the road and, for example, turn on the sprinkler," he said. "Or they could turn lights down, or connect to their set-top device and tape a movie."



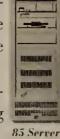
as if as distributed databases, that a single-processor server might not be able to handle.

cations, such

"Pyramid NetWare SMP is the optimal

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The new Server 95 Array models are the fastest available. With their bottleneck-eliminating



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95 Server

NET RESULTS

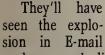
by Mark Gibbs

A call for mail bonding

f you had to pick the top 10 most important network technologies for the '90s, what would you choose? Well, I reckon one would be electronic

Even the most casual industry watcher knows about the phenomenal growth in mailboxes on public and private systems. They'll also have heard about the messaging interface

wars with Microsoft Corp. and its Messaging Application Programming Interface in the red corner and Lotus Development Corp. et. al. with the Vendor Independent Messaging specification in the blue corner.



packages and discovered that, by buying Microsoft's Windows for Workgroups and Novell, Inc.'s NetWare 3.12, they get E-mail bundled in.

So, if the computer industry is so hot on messaging, why is it so hard to find people in the industry who actually use E-mail and can be reached from external addresses? Worse still, why is it that companies (both vendors and end-user organizations) that sell E-mail products can't be contacted through E-mail? Sure, you'll find a few people who have their Email address on their business cards, but it's still surprisingly rare.

The computer industry isn't alone in ignoring E-mail for intercompany communications. Many end users have sophisticated E-mail installations that only service their organiza-

Now, in the politically correct '90s, doesn't this seem a little surprising?

Here we are trying to save trees and protect owls and be more efficient and effective in business, and we have all of these complex messaging systems. So what does the computer industry consume in mind-boggling quantities? Paper. Paper that contains information that could be more effectively distributed and used if it were electronically transferred.

Most weeks, I receive enough product literature, catalogs and press releases from the

computer industry to fill my recycling bin. For goodness sake, I get some press releases and catalogs two and three times.

If the industry used E-mail in a determined

The computer industry isn't alone in ignoring E-mail for intercompany communications. Many end users have E-mail installations that only service their organizations.

way, just think what an impact it could have. I wouldn't care if I got messaged with the same catalog or press release a dozen times. It would be easy to tell the sender that I had received it multiple times (although the chance of getting the problem

corrected is probably as low as getting off any of the unsolicited catalog lists I get through the mail).

A few vendors do make information available through E-mail. But most of those who do only do so on demand. And frequently you'll find that if you do make a request, the information you want will be sent by snail mail rather than in an electronic format.

An exception to this is Novell, which has a messaging-based library system that can be reached from the Internet or through Novell's NetWare Message Handling System service. The library allows you to retrieve press releases, patches and files. Even then, Novell still sends the paper press releases as well.

If the industry used E-mail more, we'd be able to get information faster. And if customers

used E-mail more, they could find out what's happening faster, get better support from vendors, and vendors could send them updates and fixes in a truly timely manner.

So why don't we all use E-mail more? I've heard people say that they are afraid of external connections. They're scared that a hacker might gain entry through a gateway. But this is not a real problem where messaging systems are properly configured.

Users also say they're scared viruses might be imported from the outside world. I'd be more worried about service engineers with their diagnostic disks and staff bringing in disks from home.

In the computer industry, people just don't seem to see E-mail as important to use. The industry should set an example. Vendors should demonstrate that their systems not only work, but that they can and are used for core business and communication. And the vendors who have closed systems that can't be reached through public routes should set up gateways to talk to the world.

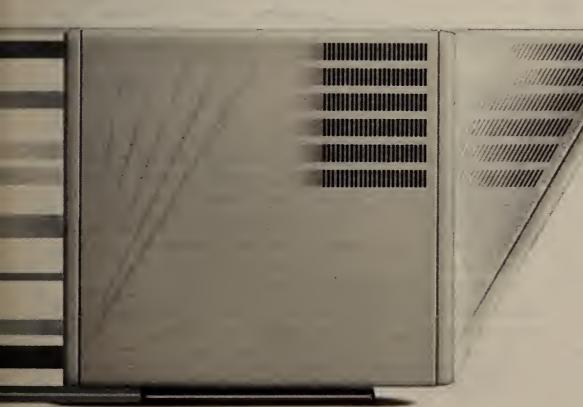
So let's get connected. Let's stop using Email trivially and make it work for us. If nothing else, our waste bins might fill up less often.

Gibbs is a writer and consultant based in Ventura, Calif. He can be reached at (805) 647-2307 or on the Internet at mgibbs@rain.org.

Comments

If you have a comment on this or any other article, drop us a fax at (508) 820-3467 or call (800) 622-1108, Ext. 487.



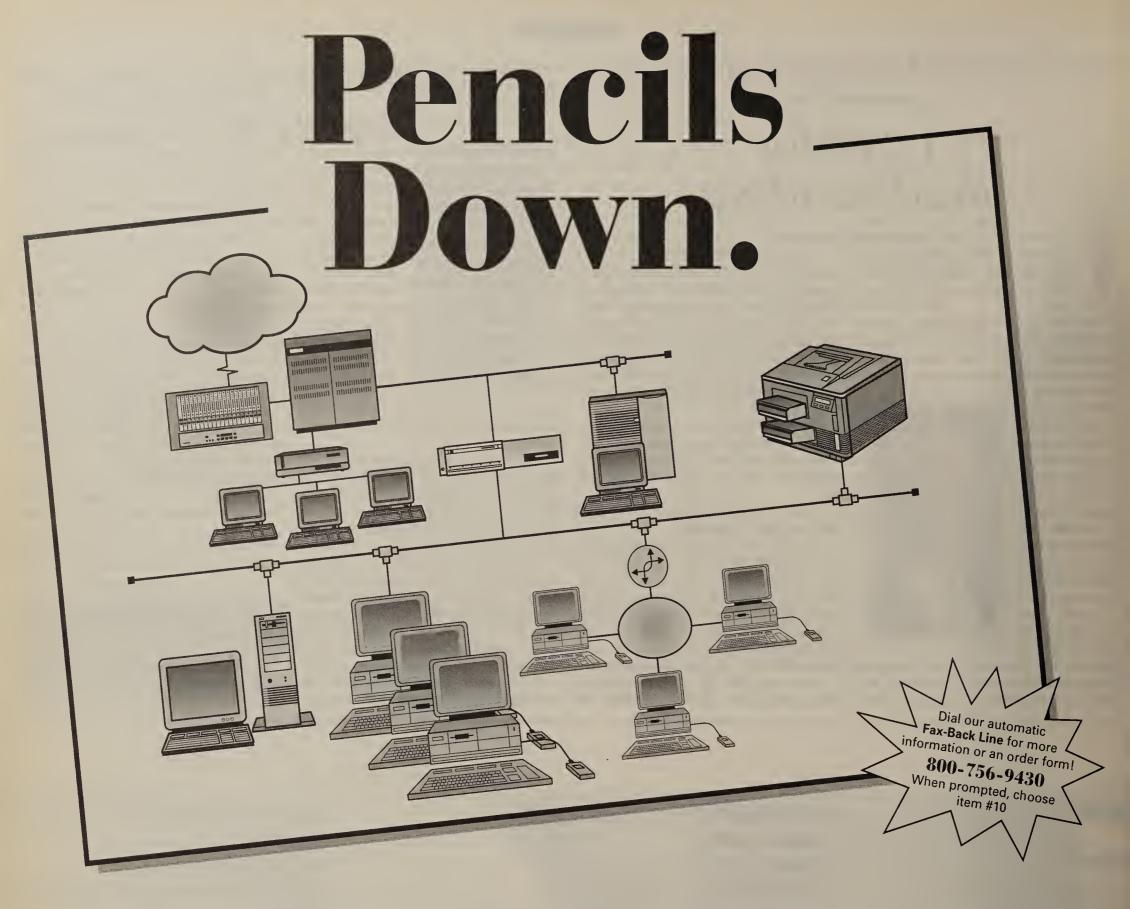


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grams currently available—Windows Draw[™]

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AT&T gains edge in circuit restoration with FASTAR

Most service restored in minutes, not hours.

AT&T before and after FASTAR

1988

A fiber cut knocks out an AT&T fiber link carrying 262 T-3s in Newark, N.J. Carrier takes roughly 5 hours to restore the first T-3.

1993

Flooding knocks out an AT&T fiber link carrying 279 T-3s in St. Louis. AT&T uses Fast Automated Restoration (FASTAR) to bring up 260 T-3s in 10 minutes.

SOURCE: FCC, WASHINGTON, D.C. AND AT&T, BASKING RIDGE, N.J GRAPHIC BY SUSAN J. CHAMPENY BY BOB WALLACE

Bedminster, N.J.

AT&T's \$500 million advanced circuit restoration system has dramatically improved its ability to rebound from outages, a benefit MCI Communications Corp. hopes to realize with a restoration system it just brought on-line.

Outage reports that the Big Three have filed with the Federal Communications Commission and interviews with top network officials reveal that AT&T has been able to restore most T-3s on downed fiber links in minutes, while MCI — until recently — and Sprint Corp. had needed hours to do the same thing.

For AT&T, the difference is its Fast Automated Restoration (FASTAR) system, which became fully operational a year ago. MCI recently brought on-line its answer to FASTAR, the Real Time Routing (RTR) sys-

Developed by AT&T's Bell Laboratories unit, FASTAR comprises custom software on a variety of network equipment that enables the carrier to restore service when fibers go down by quickly rerouting circuits using spare capacity elsewhere in the network. FASTAR reduces from hours to minutes the time needed to reroute traffic throughout AT&T's 34,000 route miles of fiber.

"There's little we can do to keep cable-seeking backhoes from tearing our fiber out of the ground,' said Rob Viola, AT&T's supervisor of business services. "But we've dramatically reduced the duration of service outages."

FASTAR has been a key issue in some users' decision to move their business to AT&T.

"Reliability played a major role in our decision to give all our traffic to AT&T," said Maralyn Rosenblatt, Lockheed Corp.'s senior telecommunications systems specialist. "FASTAR was one of the salient points of the AT&T presentation. But when it came to reliability, some other carriers were talking smoke and mirrors."

JUST THE FACTS

AT&T said work on FASTAR began in 1988 after a train derailment in New Jersey cut a fiber route between Washington, D.C. and New York. AT&T said it spent hours bringing up the first T-3 on that route.

By contrast, when an AT&T fiber cable carrying See FASTAR, page 32

Data-over-voice technology supports voice and data over the same line in the local loop. At the central office, data traffic is split off and sent over a packet network to its destination, such as a credit card authorization company's host. GRAPHIC BY SUSAN J. CHAMPENY SOURCE: INTEGRATED NETWORK CORP., BRIDGEWATER, N.J

Doubling up network traffic

Data-over-voice technology lets data ride for free.

Voice plus up to 19.2K

bit/sec data

Channel bank

Vendors face POS technology decisions

BY BILL BURCH

Washington, D.C.

After December's holiday shopping rush is over, many of the nation's retailers will be swapping out their point-of-sale equipment to take advantage of new technology that promises faster response times.

The Transaction Switching and Transport Service (TSTS), offered by the seven regional Bell holding companies, Cincinnati Bell, Inc. and Southern New England Telephone Co., will cut response times from the 10 to 13 seconds typical of current systems to as low as three seconds.

TSTS is a Bell Communications Research-developed standard for transaction processing services that takes advantage of virtual private-line technology to provide faster response times at roughly switched-service prices.

To reach those higher speeds, businesses will need to upgrade their POS terminals to support Integrated Services Digital Network or digital data over voice (DDOV), which provides a derived channel on a voice line for data transmission at up to 19.2K bit/sec. While both transmission technologies are compatible with TSTS, the two approaches have different equipment costs and transport prices. Also, because both technologies are not supported in all areas, a user's choice may be dictated by service availability from the local exchange carrier.

TSTS provides a consistent set of services nationwide that enable user traffic to be fed into local exchange and interexchange carriers' packet networks for transport to service providers, such as credit card authorization companies.

Before the development of virtual private-line services such as DDOV and ISDN, vendors with POS terminals had to choose between slow dial-up connections and leased lines that ran around \$150 per month. In one local exchange carrier's territory, DDOV is available for \$41 per month and ISDN for \$12.

While ISDN is intended to be used for a variety of applications, DDOV is more narrowly targeted for credit card authorizations and similar applications, such as data collection from automated teller machines.

See POS, page 33

FEDERAL GOVERNMENT

White House report to advocate network sharing

BY ELLEN MESSMER

Washington, D.C.

Traditionally isolated federal agencies will be sharing networks and data resources in the future in order to save money and deliver services to citizens more efficiently, according to a White House report due this

The report, based on ideas gathered from the government's information managers, will advocate that agencies take steps to pool telecommunications resources, develop shared databases and use the Internet for communicating with citizens.

While these cost-cutting ideas might seem ordinary for business, they represent a breakthrough for government, which historically has been given little incentive to consolidate operations to cut costs.

But under Vice President Al Gore's National FLYZIK Performance Review ini-

tiative launched last May, agencies in the federal government were told to come up



with ways for "reinventing government."

Based on input from federal technology managers, the vice president's office will soon issue the report "Reengineering through the Use of Information Technology," detailing changes the administration wants in the way government agencies buy and use network services.

Although procurement reform will need legislative support from Congress, many of the ideas in the report could receive immediate action, said Jim Flyzik, telecommunications director at the Department of the Treasury, who recently offered a preview of the report.

"We need to transition from an agency focus to an interagency theme," said Flyzik. "Why do 10 government agencies have to have a T-3 running between here and New

Clearly, they don't, said Flyzik, a cochair See White House, page 32

BRIEFS

print Corp. last week announced avail- bit/sec ability of its frame relay service in Austria, Belgium, Italy, the Netherlands and Switzerland, bringing to 13 the number of countries in which the service can now be used. The carrier has installed at least one of its Alcatel Data Networks ADN switches formerly the TP4900 — in each country.

Sprint supports port access speeds ranging from 64K bit/sec to 256K bit/sec in 64K bit/sec increments, depending on availability of local access links in each country. The carrier offers committed information rates (CIR) from 9.6K to 196K

Sprint already offers frame relay in Australia, Canada, France, Germany, Hong Kong, Japan, New Zealand and the U.K. Service can be provisioned in any of the 13 countries in 90 business days.

The New York Public Service Commission has elevated the state's competitive access providers (CAP) to the status of co-carriers. With the decision, New York Telephone Co. will have to set aside blocks of local phone numbers for the CAPs to assign to their customers.

Previously, the CAPs had to purchase the numbers from New York Telephone and then resell them to customers. The commission is working with the providers to iron out by December terms for interconnection of the carriers' networks, including "meet point billing" for termination of calls on rival carriers' networks.

As expected, Infonet Services Corp. last week announced support for dial-up access to its Infolan router-based local-area network interconnection service.

The new Infolan Switched Access Service enables users at remote sites to establish analog links to Infolan at speeds of up See Briefs, page 33

RATE & TARIFF MONITOR

by David Rohde

Intra-LATA toll calls: Trick or treat?

ing to California?

hy all the fuss over intra- have put in intra-LATA toll competition with-LATA toll competition com- out mortally wounding their Bell operating companies. And since California users won't After all, 41 other states be given a presubscription option, their intra-

LATA toll calls still will be carried by Pacific Bell or GTE unless they dial a five-digit access code. Right?

Turns out it's more complicated than that.

Usually, AT&T and its competitors offer lower intrastate long-distance rates than the BOCs. And that's just on the straight Dial "1" switched access schedules. For interexchange carrier services utilizing dedicated access, the cost per call is even lower.

As a result, whenever intra-LATA toll competition comes to a state, users with dedicated access to long-distance carrier's benefit immediately. All these users have to do is make sure their PBX software recognizes all toll calls both within and outside the LATA — and start routing them to the interexchange carrier.

Plus, these users get a hidden benefit: Their intra-LATA toll usage starts counting toward interexchange carrier volume discounts. Consider a firm with AT&T's Megacom WATS service using T-1 access. AT&T lets users aggregate total intrastate, interstate and international usage for Megacom volume discounts. The extra usage could push the firm into the higher discount level.

For firms with multiple locations, the benefits multiply as intra-LATA toll competition pushes across the country. Even single-LATA states — largely concentrated in New England

— generally let the long-distance companies carry intrastate toll traffic. In Connecticut, where state regulators opened up the market this summer, AT&T offers its basic commercial long distance service at rates ranging from 14 to 22 cents a minute.



But none of these benefits are automatic.

For starters, it's not universally true that the local exchange company has higher toll rates than the interexchange carriers. Some of the Bell Atlantic operating companies offer more attractive toll rates than the long-distance companies. For a 50-mile intra-LATA toll call, Bell of Pennsylvania charges 28 cents for the first minute and 18 cents for each additional minute. Compare that with 37 and 21 cents, respectively, for both AT&T and Sprint, or 36.4 and 20.9 cents for MCI.

The unwary telecommunications manager can fall into some traps in evaluating intra-LATA toll traffic. Some tips:

- Check the mileage bands carefully. Some local exchange carrier toll tables are very sensitive to small increases in distance. At some levels, Bell of Pennsylvania's toll charges increase by 2 cents every six miles.
- Check rate periods. In some Midwestern areas, night calling rates for the local exchange carrier start an hour earlier than the usual patterns established by the long-distance
- Watch out for intra-LATA traffic that crosses state boundaries. It's easy to forget that many LATAs capture exchanges in neighboring states (as opposed to area codes, which never cross state lines).

Example: Diamond State Telephone will charge 13 cents for the first minute and 10 cents each additional minute for toll traffic it carries within Delaware. But cross state lines and the BOC's rates start at 24 cents per minute.

Southern New England Telephone didn't

stand still when competition arrived in Connecticut this summer. It lowered its toll rates and instituted volume discounts. Now Pacific Bell is anticipating the intra-LATA competition expected in 1994. New services, lower toll rates and even some contract tariffs are all part of the firm's counteroffensive. It's probably a good idea for it not to be complacent. Rohde is associate publisher of the Center for Communications Management Information in

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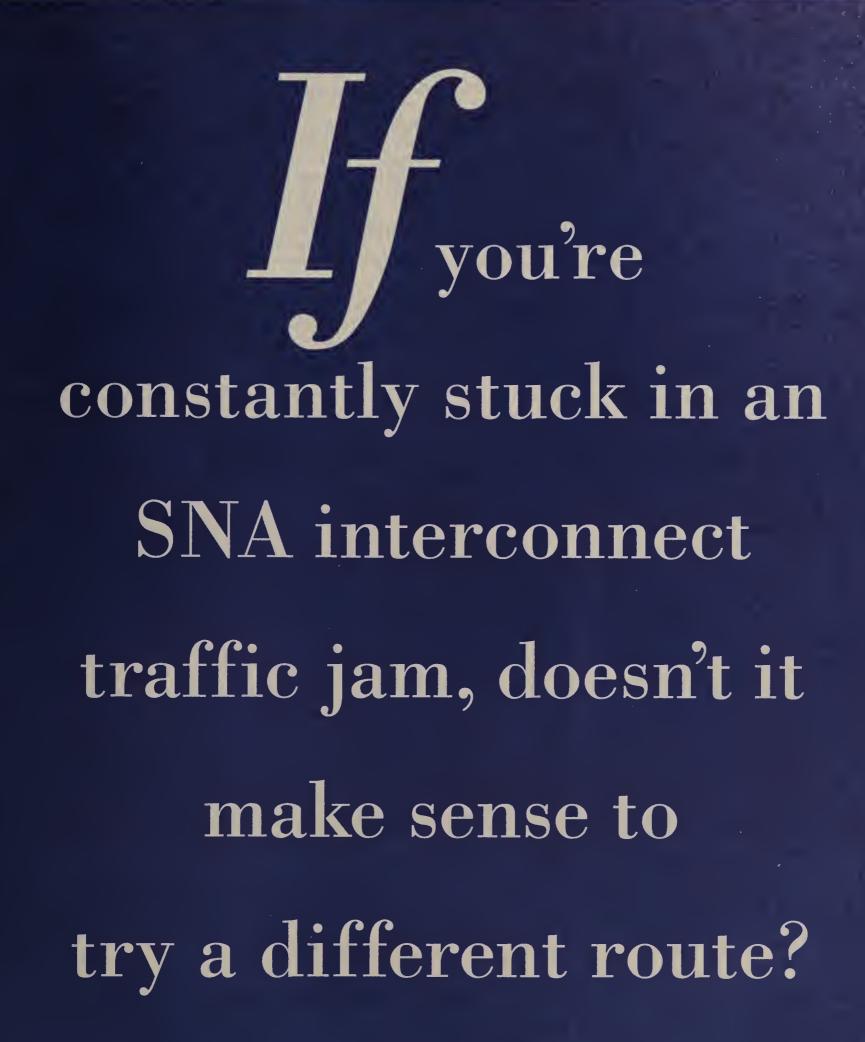
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GSA holds federal town meeting on post-FTS 2000

Government users seek wireless, ATM services.

BY ELLEN MESSMER

Washington, D.C.

Federal government users are forming a wish list of services and enhancements to be included in the next version of the FTS 2000 contract, with such items as wireless data and

ATM offerings, better interoperability and improved billing topping the list.

The government is only halfway through the 10-year Federal Telecommunications System 2000 contract awarded to both AT&T and Sprint Corp., which serve separate federal

agencies. But the General Services Administration wants to define next-generation services now so new procurements and a complete transition can be completed by 1998.

Toward that end, the GSA late last month held the equivalent of a federal town meeting here to get user input about requirements for the follow-up to FTS 2000.

"We found [it can take a couple of years to transition] data and videoconferencing [services]," said Don Scott, GSA's associate administrator for FTS 2000.

The U.S. Department of the Treasury, which spent \$98.9 million in FTS 2000 services last year, wants to see cell-based services such as Switched Multimegabit Data Service and Asynchronous Transfer Mode in any post-FTS 2000 requests for proposal the GSA issues.

The Treasury Department also suggested that the RFPs should include value-added services, such as X.500 and electronic data interchange, and a range of cryptographic services, such as encryption and electronic signature verification.

A recent study based on interviews with hundreds of individuals in federal agencies by Mitre Corp., the government-funded think tank, indicated that the post-FTS 2000 governmentwide contracts should offer choices ranging from old-fashioned analog voice services to futuristic wireless video services.

"There's no agency consensus on a general form for the FTS 2000 successor," said John Okay, chairman of the Interagency Management Council's Future Communications Services Working Group. But he said interoperability emerged as a chief concern since those interviewed expect more sharing of data

between agencies (see

story, page 27).
"Interoperability important, especially for switched data services," said Bruce Brignull, GSA assistant deputy associate. Although AT&T and Sprint in general are getting good marks on their FTS 2000 services, they have not yet achieved interoperability SCOTT for FTS 2000 switched data services, Brignull added.



Government users also spoke out against the mandatory use policy, which requires them to buy AT&T and Sprint FTS 2000 services rather than looking elsewhere.

"We support the continuation of a large government program, but we want more competition by vendors," said Alan Proctor, deputy executive director of planning and information at the Federal Trade Commission.

"It should not be a mandatory system because if you have a good service, people will come to you," said Roger Cooper, deputy assistant attorney general for information and resources management at the Department of Justice. "If you have a good deal, you'll have customers."

Cooper urged government policymakers to take a close look at the Internet model, where users pay only for access and face no usage charges. Such a model would simplify telecommunications billing procedures, which agencies say are a major headache, particularly for tracking data usage.

Network managers from state agencies also got a chance to speak out at the meeting here.

According to Russ Bohart, director of the state of California's Health and Welfare Agency data center, "Sixty-five cents out of every dollar I spend is a federal dollar, but I can't access FTS 2000 because I'm not a federal entity. In the post-FTS procurement, we don't want to be part of the mandatory allocation, but we would like to be able to use it.

"We in the government have to work together," Bohart said. "You can't view us as a foreign government."

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AT&T Network Systems And Bell Laboratories. Technologies For The Real World.



FASTAR

Continued from page 27

102 T-3s from Baton Rouge, La., to Houston was cut on March 15. FASTAR rererouted 94 of them in under four minutes.

FASTAR uses software-controlled Digital Access and Cross-Connect System (DACS) IIIs, which can be preprogrammed remotely from an AT&T operations center to quickly reroute individual T-3 lines.

To monitor fiber cables for failures, AT&T developed a special-purpose device called a Restoration Node Controller (RNC) that is driven by custom software.

If the RNC senses a loss of signal, it uses AT&T's public packet network or its Skynet satellite service to notify an application called Restoration and Provisioning Integrated Design (RAPID) running on computers in Conyers, Ga., and Denver.

RAPID correlates data from the RNC with its database of AT&T network circuit routes to find alternate paths for failed circuits, then transmits new routing instructions to the

White House

Continued from page 27

of the National Performance Review's government information technology services group, one of about three dozen teams pulled together to focus on specific issues. "Clearly, the key is getting agencies to work together."

The National Performance Review housecleaning has unearthed dozens of isolated interest groups scattered throughout government agencies all working separately on network issues, such as governmentwide electronic mail, smart cards and electronic benefits systems for citizens. "We'll pull the diverse groups together," Flyzik said.

The White House report this month will advocate use of a common network for electronic benefits transfer in programs ranging from food stamps to social security, employing the existing electronic banking structure.

"Technology is

the key to reinventing

government,"

Flyzik said.

"Technology is the key to reinventing government," said Fly-zik. "We need a migration to elecgoverntronic

"The businessman today reports

the same tax information to 38 government entities — federal, state and local," said Flyzik. "Why not just report once?"

The National Performance Review report will also recommend the establishment of a nationwide wireless and wireline network for law enforcement and public-safety agencies. To be used by federal agents, state and local police, and officials involved in disaster recovery, the law enforcement network would eliminate the severe interoperability problems between the voice and data systems used by all

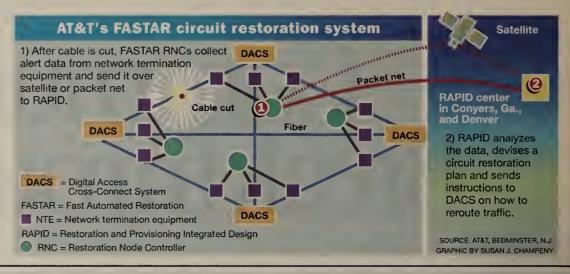
these various groups, Flyzik said.

The federal government likewise lacks a uniform E-mail system, he pointed out. Flyzik said this is partly due to interoperability problems in X.400 software and partly because connectivity between Sprint Corp. and AT&T, the two providers of Federal Telecommunications System 2000 telecommunications services to the government, is not widespread. appropriate DACS.

RTR TO THE RESCUE

RTR promises similar benefits for MCI, which will help the carrier withstand disasters like the one on May 27, when MCI lost a fiber route carrying 100 T-3s between Beaumont, Texas, and New Orleans. MCI said it got the first chunk of the T-3s restored using alternate routes in roughly an hour.

With RTR, which works like FASTAR, MCI can recover from such outages in roughly 15 minutes using capacity on unused routes, said Fred Briggs, MCI's senior vice president of

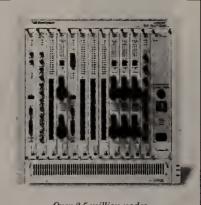


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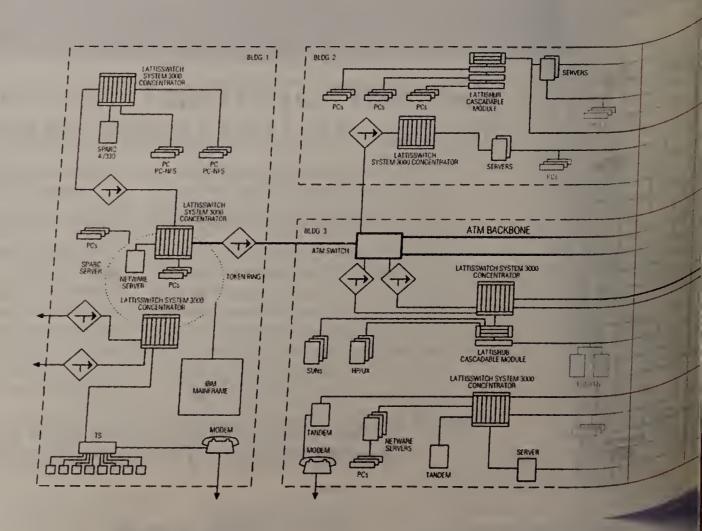
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network engineering.

Sprint is relying on self-healing SONET rings to cure its outage problems, such as when a fiber link carrying 85 T-3s from Baton Rouge to New Orleans was cut on March 2. The carrier was only able to get 26 of the T-3s up in the first 15 to 20 minutes, said Karl Kramer, Sprint's vice president of network operations, said

To cure such ills, Kramer said the carrier will begin installing SONET rings throughout its long-distance network by year end, a project that will conclude sometime in 1996.

POS

Continued from page 27

DDOV multiplexes voice and data traffic, allowing merchants to run transaction processing data over a voice line at speeds of 2,400 to 19.2K bit/sec. With DDOV, merchants typically get a response back from the processing center in four to six seconds. For an ISDN link, vendors connect over the D channel at 16K bit/sec; response times can run as low as three seconds per transaction.

While the two technologies yield similar

response times, equipment pricing currently favors DDOV. A 2,400 bit/sec DDOV multiplexer runs around \$350; the cost of ISDN equipment ranges from \$550 to as high as \$950 for the terminal adapter and network interface unit needed to set up a POS operation now, but prices are expected to fall to match the DDOV boxes.

On the service side, pricing favors ISDN. For example, Pacific Bell charges \$27 per month for both services, but the carrier also charges DDOV customers an additional \$15 per month in port charges. On installation, the carrier is asking \$200 for DDOV, but only \$150

for ISDN, if customers are willing to sign up for a minimum of two years.

For Pacific Bell and other local exchange carriers, POS systems are an opportunity to win a new group of users for ISDN. "It would not be good business sense to deliberately put forth programs to do both [DDOV and ISDN] when ISDN is your future," said JoAnne Bihary, product manager for business and data services at Nynex Corp.'s Telesector Resources Group.

Still, almost all of New York Telephone Co.'s POS customers are using DOV, and the carrier is committed to providing whichever service customers request, Bihary said. Like Pacific Bell, Nynex's prices also favor ISDN. For users with a voice line, adding DDOV costs an extra \$41 per month. For users that have an ISDN line, running data over the D channel only costs \$12 per month.

Aside from price, users have to figure in coverage areas on the two services. Nynex has analog and digital DOV available for all 250 central offices in its New York City local access and transport area, while ISDN is available only in 15 to 16 central offices. In California, coverage is heavily weighted towards ISDN with 57 switches equipped, compared with only 15 for DDOV.

Over the long term, Nynex is planning to urge customers on to ISDN links. In upstate New York, New York Telephone will only be offering ISDN. Pacific Bell, too, says ISDN will be its primary focus. According to Kathy Panfili, packet switching product manager with Pacific Bell's Data Communications Institute, after an initial surge of interest in DDOV, demand for the service has leveled off.

To Panfili's eye, the main difference between the two technologies is that ISDN provides vendors with room to grow. If they're just using 16K bit/sec D channel for the POS system, users have 128K available on the bearer channels for other applications, such as voice service, file transfers or even videoconferencing. On the DOV side, users can only go up to a 19.2K bit/sec transmission rate.

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Mel Lively, network manager for PHS, claims SynOptics helped him achieve almost 100% uptime. "I don't know anyone else who can match that record," declared Lively. "And that kind of reliability ends up saving significant time and money in the long run."

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The Network Fabric of Computing



BRIEFS

Continued from page 27

to 14.4K bit/sec. Previously, the Transmission Control Protocol/Internet Protocol net was accessible only via dedicated links

Infonet said it will soon introduce 56K/64K bit/sec access speeds worldwide and will also make Infolan dial IP access speeds of up to 256K in some unspecified locations early next year.

LCI International, Inc. last week announced general availability of a frame relay service that is available now through the carrier's points of presence in the U.S.

The service, dubbed FramePlus, supports port access speeds from 56K/64K bit/sec in 64K bit/sec increments up to 1.544M bit/sec. Users can subscribe to a CIR starting at 16K and including 32K, 64K, 128K, 256K bit/sec. Users pay an unspecified fixed rate for the service.

The carrier will support integrated access, a capability that will enable customers to access FramePlus and other network services through a single dedicated access line.



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Perot Systems evaluates E-mail interconnect options

BY WAYNE ECKERSON

Richardson, Texas

When a company's chief executive officer relies heavily on electronic mail to communicate with managers and workers, the E-mail system better be reliable and provide seamless connectivity to all users.

This is the case with systems integrator Perot Systems Corp., whose CEO, Mort Meyerson, exchanges more than 7,000 electronic messages a month with 1,700 employees in 20 offices worldwide as well as with hundreds of people outside the firm.

To build its mission-critical Email system, Perot Systems' electronic messaging staff last year evaluated a handful of products and deployment options to interconnect islands of installed E-mail products.

Perot Systems has a 3270-based E-mail product called EMC² from Fischer International Systems Corp., CE Software, Inc.'s

QuickMail, Lotus Development Corp.'s cc:Mail and Simple Mail Transport Protocol (SMTP) mail.

Late last year, the firm implemented an X.400 message switch from Worldtalk Corp. that translates and routes messages between heterogeneous E-mail systems using X.400 as a standard message for-

> However, before settling on X.400 and Worldtalk, Perot Systems rejected several options,

including deploying pointto-point E-mail gateways. Its SMTP-to-QuickMail gateway, for example, was a bottleneck that didn't support the features of both E-mail sys-

Perot Systems then considered replacing the separate systems with a single E-mail system, such as Post Office Protocol (POP) mail, which provides a multiplatform client interface to SMTP mail. But this was considered too expensive because it would involve purchasing too much new software and retraining users, said Bill Brown, an associate in charge of Email at Perot Systems here.

In addition, POP mail did not provide adequate support for remote Email users and would have required Perot Systems to accelerate the deployment of Transmission Control Protocol/Internet Protocol nets in all its offices. Also, SMTP did not at the time support multimedia attachments, such as spreadsheets, video and voice files.

"The [Multipurpose Internet Mail Extensions] weren't around in 1992 and are still not ubiquitous," Brown said. MIME enables SMTP users to send multimedia attachments across TCP/IP nets.

Perot Systems also examined Novell, Inc.'s Message Handling System (MHS) as a universal messaging backbone. The group rejected MHS because they considered it proprietary and incapable of handling long address names

The company decided its best option was to build an X.400 messaging backbone, which

Perot Systems sizes up E-mail options

Following a detailed product evaluation, Perot Systems selected Worldtalk's Worldtalk 400 to interconnect its

System	Reason for choosing or rejecting product
Worldtalk Corp.'s Worldtalk 400	X.400-based; best supports user's existing E-mail systems
Novell, Inc.'s MHS	Proprietary; doesn't alias long names
Unix mail	Dial-in support weak; requires TCP/IP
Digital Equipment Corp.'s All-in-One	Too expensive
Retix's OpenServer 400	Poor support for CE Software, Inc.'s QuickMail
Soft-Switch, Inc.'s Central	Too expensive

would convert incoming messages into the X.400 format and then into the format of the target E-mail system.

"We decided to go with X.400 based on the way the market was heading at that time,' Brown said. "The only thing besides X.400 that had worldwide acceptance as an E-mail standard was SMTP, and that had shortcomings."

X.400 OR BUST

Perot Systems then looked at X.400 back-See Perot, page 39

BRIEFS

The Healthcare EDI Corp. will sponsor a live satellite teleconference on the topic of implementing electronic data interchange in the health care

The teleconference, which will be broadcast Nov. 9 from noon to 2 p.m., will explore how to implement EDI enterprisewide to conduct business electronically.

Call (914) 265-4635 for more information.

Trinzic Corp. recently announced that its Forest & Trees client/server query and reporting tool can access data stored in Informix, Inc. OnLine relational databases. This boosts the number of data sources accessible by Forest & Trees to more than

Trinzic also announced that Forest & Trees applications can be integrated with other desktop applications via Microsoft Corp.'s Dynamic Data Interface.

Trinzic: (617) 891-6500.

SAP AG recently announced Version 2.1 of its R/3 client/server applications package which contains modules for finance, human resources, manufacturing and quality management.

The new release offers added functionality in its manufacturing and logistics modules and supports an enhanced graphical user interface. It also incorporates executive information system capabilities and supports an interface to optical archiv-

SAP: (215) 521-4500.

ICL recently said it will port its Teamware line See Briefs, page 38

Sybase ships System 10 products

Releases SQL Server 10; Navigation and Replication Servers to come.

Now

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November

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* Price based on number of clients, sites and hosts.

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Sybase System 10 product roster

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module for Oracle Corp.'s Oracle7 RDBMS); \$2,550-

\$102,460 (access module for IBM DB2)

To be announced

To be announced

To be announced

Backup Server)

\$290-\$32,020

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BY PETER LISKER

Emeryville, Calif.

ybase, Inc. has made good on its promise to deliver most components of its flagship System 10 database product line this year, although several of the most significant

Product

SQL Server 10

Open Client

Open Server

Administrator

Companion

SQL Monitor

Navigation Server

Systems

Gateway

Embedded SQL

pieces will not ship until later this year or until

Products available this year include the company's flagship SQL Server 10 relational database management system, as well as new application program interface software and database administration tools.

Those products yet to ship include the following: Navigation Server, which will bring parallel processing capabilities to Sybase databases; Configurator, which will enable administrators to configure distributed databases; and Replication Server, which will allow data to be copied across multiple databases over a net.

Navigation Server and Configurator will be alpha-tested in December, with general availability scheduled for the second half of 1994. Replication Server is expected to become generally available later this month.

The System 10 product collection is designed to meet the needs of users concerned with "moving to, or expanding their use of client/server computing" while maintaining "the performance, security and control of the mainframe, "said Stu Schuster, Sybase's vice president of marketing.

Sybase announced that SQL Server 10, the company's core database system, began shipping last month. The product will run on

parallel processing systems and can be distributed across a network.

The database system was selected recently as the core technology for a \$149 million contract from the U.S. Air Force, which will use the system to move the armed forces, Department of Defense, and Internal Revenue Service away from proprietary hosts to a cli-

ent/server environment.

SHIPPING SERVERS

SQL Server 10 is shipping on servers from Digital Equipment Corp., Hewlett-Packard Co., IBM, NCR Corp. and Sun Microsystems, Inc. Sybase also expects to support 13 more platforms, including those of Data General Corp., Pyramid Corp., Silicon Graphics, Inc. and Unisys Corp., within 90 days. A version of SQL Server 10 for Microsoft Corp. Windows NT and IBM OS/2 environments will ship in the first half of 1994.

Sybase has also begun shipping its Open Client, Open Server and Embed ded SQL software. The Open Client and Open Server products let users build applications that can communicate with databases across multivendor nets.

The Embedded SQL 10 is a precompiler available in C, COBOL and Ada that

allows users and third-party vendors to write custom applications for SQL Server database environments.

Sybase also released Systems Administrator (SA) Companion, which lets systems and database administrators locally or remotely manage distributed databases. Using SA Companion, database administrators can install and configure new servers, add or delete databases, users and objects, and add or delete devices.

©Sybase: (510) 596-3500.

VOICE RECOGNITION

France Telecom lab licenses voice recognition technology

BY MARTIN LAMONICA

for yo

If you prefer giving spoken instructions to punching telephone keypads or would like your database to "tell" you the results of a query instead of displaying them, then France Telecom may have developed the technology France Telecom's Centre National d'Etudes des Telecommunications (CNET) said it has mastered its voice recognition and text-to-speech technology well enough to begin licensing its work to third-party developers for personal computer-based applications. CNET

assures from 80% to near-perfect voice recognition, depending on conditions.

A team of about 20 developers at CNET is focusing its efforts on "word-spotting" systems that allow a user to interrupt as a server provides a list of spoken commands.

For instance, a chain of cinemas, Les Baladins, in the north of France uses CNET's system, dubbed PHIL90, to give users information about cultural activities. During a recorded message, the caller speaks one word, such as "programs," from a list of options to reach another menu, which will recite films that are playing. PHIL90 "listens" for a single

word so a user can speak somewhat naturally, saying "I want the list of programs" instead of simply "programs."

"Speaking isolated words is more natural and pleasant," than using a telephone keypad to punch in requests, CNET's Chief Engineer Andre Soubigou said. The PHIL90 system can also integrate push-button commands into a vocal system, which is more effective than speaking numbers.

PHIL90 matches a caller's spoken words with a database of prerecorded words, which are constructed from about 1,000 voice samples. This onerous word recording system limits a system's vocabulary, officials admit, but they claim it allows for a range of pronunciation and, thus, better recognition.

Moreover, since PHIL90 only listens for one word at a time, system requirements are simpler. A PC-based system with a voice-recognition card linked to a private branch exchange can store and treat as many as 30 voice commands, Soubigou said.

The PHIL90 technique is not limited to the French language. Hoping to sell its system abroad, CNET has also developed a prototype system that allows a user to choose German, French or English at the start of a PBX's recording and navigate vocally in the chosen language thereafter.

The second major focus of CNET's PC/voice integration technology is its text-to-speech technique. A computer telephony integrated system can recite words from text that is stored in a database. CNET calls this "word synthesis" because it constructs words and sentences from a database of sounds, rather than complete words.

This system, patented under the name PSOLA-TD, "has an unlimited vocabulary since it takes 1,500 'bits' of words and links them together," Soubigou said. By taking word "elements" to construct a phrase rather than reciting word by word, CNET's technology gives the computer a more natural, albeit still somewhat robotic sound. PSOLA-TD does stock several hundred complete phrases, such as "Hello" and "Welcome," in order to sound less machine-like.

Like PHIL90, this text-to-speech technique is multilingual. Hoping to license its technique abroad, CNET has developed a German version of PSOLA-TD, and English, Spanish and Italian versions are being developed in conjunction with different research laboratories.

France Telecom plans to employ this text-to-speech system with its operators. Once operators make a query onto a database for a phone number or address, the system can orally confirm the information given out, officials said.

A French distributor, Camif, has already established a telephone service for its clients to order new stock. A caller with an account at Camif chooses items to be delivered from a PBX recording with a push-button phone. Once the client enters his confidential code, the Camif server recalls the client's account information and, using the PSOLA-TD technology, orally confirms delivery information, including the address and time.

◆ LaMonica is a European correspondent for IDG News Service.

Comments

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E-MAIL

UniPalm extends LAN E-mail to the enterprise

BY WAYNE ECKERSON

Santa Clara, Calif.

UniPalm, Ltd. this week will unveil at the E-Mail World Conference and Exposition here a Windows-based electronic mail

package that provides connectivity between LAN-and Unix-based E-mail systems.

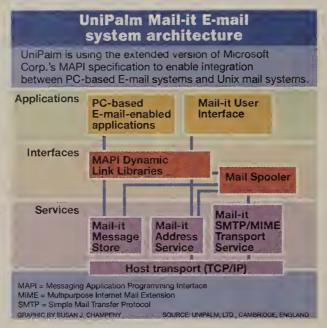
Called Mail-it, the client software enables users of Microsoft Corp. Messaging Application Programming Interface (MAPI)based applications to exchange messages with Unix mail users via the Simple Mail Transport Protocol (SMTP) and the Post Office Protocol (POP).

UniPalm's software extends the reach of feature-rich, localarea network E-mail systems, such as Microsoft Mail and Word-Perfect Corp. Office, across Transmission Control Protocol/Internet Protocol networks without sacrificing functionality.

Currently, LAN-based E-mail systems can exchange messages with Unix E-mail systems through gateways. Unfortunately, these gateways typically strip away LAN E-mail functionality, such as the ability to

append binary documents.

UniPalm's Mail-it does away with the need for gateways by supporting both MAPI and the Internet Engineering Task Force's Multipurpose Internet Mail Extensions



(MIME), which specify a standard way for SMTP-based E-mail users to exchange multimedia messages and binary attachments. As a result, Mail-it enables LAN- and Unixbased E-mail users to exchange messages

without losing the features of each system.

"Mail-it combines the best of the MAPI and MIME worlds," said Tom Kermeen, product manager for UniPalm, a \$13 million company in Cambridge, England that provides TCP/IP-based products and services. "It extends the functionality available in LAN-based E-mail systems across TCP/IP backbone networks."

To create Mail-it, UniPalm fleshed out the Microsoft specifications for an extended version of MAPI, Microsoft's specification for building mail-enabled applications. Extended MAPI builds on Simple MAPI, which consists of 12 basic E-mail calls. Vendors have produced products that comply with Simple MAPI, but few have delivered products based on Extended MAPI.

Mail-it runs on Windows-based personal computers and requires that client workstations support WinSock-compatible TCP/IP software and POP, which provides a robust client interface to SMTP mail.

Mail-it also requires a Unix host that runs SMTP and POP. The Unix host must support the Unix-to-Unix Copy Protocol for remote Mail-it users to gain access to Unix mail.

Mail-it features include a filtering utility that automatically files incoming messages based on predefined parameters. It also can automatically launch applications required to edit E-mail attachments, such as spreadsheets or word processing documents.

Mail-it is \$700 for a five-user pack. It will be available in January. Evaluation copies will be available at the E-Mail World show.

©UniPalm: 011 44 223 250100.

BRIEFS

Continued from page 35

of groupware products to Novell, Inc. NetWare. TeamWare products currently run on Windows NT, OS/2 and Unix System V Release 4 servers and support a variety of personal computer-based clients. ICL will roll out NetWare Loadable Module versions of TeamWare products later this year and early 1994.

ICL: (714) 855-5500.

Lotus Development Corp.'s Consulting Services Group's Education and Training division has introduced a computer-based training product designed to increase Lotus Notes proficiency and productivity.

The new system, developed in conjunction with CBT systems of San Francisco, Calif., is Windows--based software that provides 90 hours of instruction. The entire course will be available by March, 1994 at an average price of \$1500 per module

Lotus: (800) 346-6409.

The Wang Corp. has signed a technology agreement with Effective Management Systems, Inc. and Earnest & Associates to incorporate Wang's OPEN/Image software into the two firms' manufacturing and distribution software products.

Both products will run on IBM AIX and Hewlett-Packard Co. HP-UX platforms. EMS's product will also run on Digital Equipment Corp.'s VAX VMS platforms initially.

EMS: (800) 962-1279; Earnest: (410) 766-6076.

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PeopleSoft expands apps line

BYPETER LISKER

ew York

PeopleSoft, Inc. last week announced work flow and other enhancements to its existing human resources and financial client/server packages and two new applications.

The announcements are intended to better position PeopleSoft as a vendor of a complete suite of client/server applications to meet the needs of users looking to migrate applications from larger systems. However, most of the products and enhancements discussed will not be available until the end of next year.

PeopleSoft will enhance its existing PeopleSoft Financials and PeopleSoft Human Resource Management System (HRMS) client/server application software in several ways, including the integration of additional work flow capabilities. PeopleSoft's applications already include some basic work flow technology that can be used to automate approval cycles for expense reports, timesheets and other items, as well as provide support for images and outgoing electronic mail.

To enhance the work flow capabilities of its applications, Peo-

pleSoft introduced its Open Workflow strategy for integrating work flow applications from other vendors with PeopleSoft applications. PeopleSoft is trying to encourage vendors in the newly created Open Workflow Partners Program to build interfaces between their work flow packages and PeopleSoft applications. PeopleSoft is looking to implement four types of work flow technologies with its software: electronic forms, E-mailbased work flow, database-centric work flow and imaging.

Besides adding new work flow capabilities to PeopleSoft Financials, the product has been enhanced to include two new modules: PS/Project Cost for project costing and analysis, and PS/Budgeting for budget analysis and reconciliation. Both will be available in the fourth quarter next year.

In the lucrative human resource management field, the PeopleSoft HRMS package will be updated via the addition of PS/Resume Reader, PS/Defined Benefits, PS/Time and Attendance and PS/Labor Distribution modules. These new modules will be available in the fourth quarter next year, with the exception of PS/Resume Reader, which will be

based on MicroTrac Systems, Inc.'s RESTRAC application and will debut by year end.

PeopleSoft also discussed plans for two new client/server applications: PeopleSoft Distribution for materials management and distribution, and PeopleSoft Student Information System (PeopleSoft SIS) for tracking student records and related data.

PeopleSoft Distribution consists of four integrated applications, including modules for purchasing, inventory, order processing and billing. The applications can operate by themselves or work in combination with other PeopleSoft and non-PeopleSoft applications. The purchasing module will be available in the third quarter of 1994, with the rest of the modules available in the fourth quarter of 1994.

PeopleSoft SIS will include modules for student records and accounts, financial aid, admissions, housing and record archiving. The records and accounts module is scheduled to ship in the third quarter of 1994, and the remaining modules are scheduled for delivery in the fourth quarter of 1995.

©PeopleSoft: (510) 946-9460.

Perot

Continued from page 35

bone products from Digital Equipment Corp., Soft-Switch, Inc., Retix and Worldtalk. The group rejected Soft-Switch's Central system and DEC's Allin-One products because they were too expensive, Brown said.

The group then piloted Retix's OpenServer 400 switch and Worldtalk's Worldtalk 400 message switch. The products were comparably priced, ran on personal computers and supported all the E-mail environments at Perot Systems.

However, pilot tests revealed that the Retix switch failed to transfer QuickMail messages.

"Retix's QuickMail gateway flat out didn't work," Brown said. "We spent a month or two going around with Retix support but never got to the bottom of it."

A Retix official said the QuickMail gateway Perot Systems tested was a prerelease version of a third-party product. After the problems were discovered, Retix decided to drop the third-party product and develop the QuickMail gateway in-house.

That narrowed the selection to Worldtalk 400, which at that time ran on an Intel Corp. 80386-based PC. While not optimal, Worldtalk 400's biggest advantage was that it worked.

"[Worldtalk 400] was acceptable

and functional, but we had some outstanding issues with it," Brown said.

For one, the product did not map addresses into the proprietary address formats of other E-mail systems, leaving message recipients with unfamiliar return addresses. Also, QuickMail messages with addresses longer than 32 bytes would be lost moving through the switch. Brown said the problems with QuickMail stemmed from a bug in the CE Software product rather than Worldtalk 400, however.

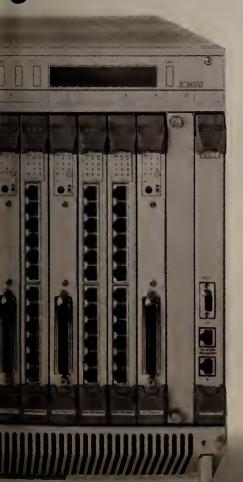
Perot Systems fixed both problems when it upgraded in January from the 386-version of Worldtalk 400 to a version that runs on a Hewlett-Packard Co. 9000 series Unix server. The Unix-based Worldtalk gateway contains a feature called Alias Manager that enables users to view return addresses in their native E-mail format instead of an X.400 format. This circumvented the 32-byte limitation of QuickMail addresses and let users see all addresses in their native address format.

"Now it's almost transparent to users that there are other kinds of mailers out there that they are comunicating withother than their own," Brown said.

Even though MIME may become a popular industry standard, Brown said he does not regret choosing an X.400-based system. That is because Worldtalk plans to upgrade its core messaging backbone to support the functions and features available in most E-mail systems, including MIME. Ξ

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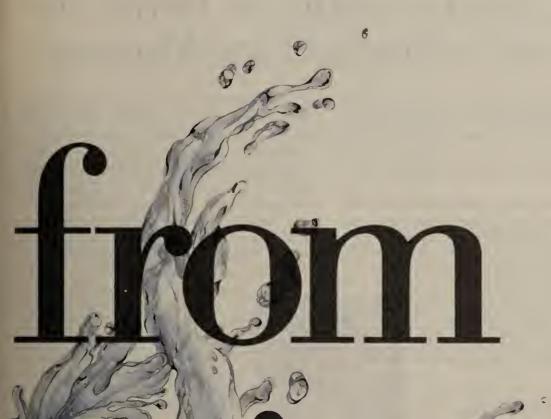
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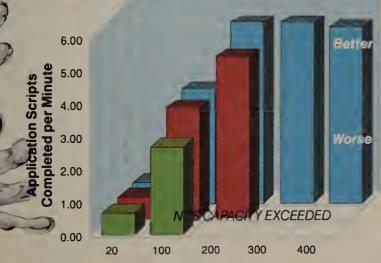
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Editorial

Cellular digital packet data (CDPD) services promise to be a key driver in the evolution of mobile computing, but cellular carriers need to do one thing from the start: Drop the idea of roaming charges.

Roaming charges are well known to users of switched cellular services, who've been burned by some pretty high fees, charged on top of their standard rates, for accessing services outside their cellular provider's area. In some cases, roaming charges can be as high as \$1 per minute, plus an additional daily fee, simply for the privilege of turning on the phone and making calls when you've strayed a bit too far from home.

There's been a movement, led by Southwestern Bell Corp., to do away with roaming fees for switched services. That's a positive development. Improved billing and user verification systems are reducing the potential for fraud and, thus, the rationale behind roaming fees.

But some top officials in the cellular community have made it pretty clear that roaming charges are being planned for the CDPD world.

One official with GTE Telecommunications said cellular carriers are in the process of working out roaming charge agreements for CDPD, but he assured us that they won't be excessive like the charges in the switched cellular world. "This time we're going to do it right. We're going to make it easy for roaming customers," he said.

If carriers really want to do the right thing and make it easy for mobile computing users, they'll abandon the idea of roaming fees altogether. CDPD, which supports TCP/IP, has been hyped as the wireless on-ramp to the Internet. But a pricing scheme that includes roaming charges isn't going to sit well with flat-rate-paying Internet users who aren't even accustomed to the per-packet charges that CDPD users will likely be assessed. Roaming charges are anathema to what is being called the Internet model of pricing.

We're not the only ones unhappy about the prospect of roaming charges for cellular data services. An executive at one company developing a CDPD modem, when told roaming charge agreements are in the works, expressed dismay, knowing the fees won't help win converts to the technology.

Before CDPD gets deployed on a large scale, cellular providers should abandon the concept of roaming charges. There will be plenty of money to be made on wireless computing customers without penalizing them for their mobility.

-> JOHN GALLANT

Teletoons

FRANK AND TROISE



REALITY CHECK

by Thomas Nolle

Hub, router vendors battle for users' collapsed backbones

ubs and routers have always been natural enemies. Despite brief attempts at reconciliation (remember the "rub"?), the two product types are now facing off in the ultimate death struggle for the ultimate prize —

Whatever the strategy of the day for internetworking may be, it's sure to include the concentration of all premises local-area networks onto some kind of backbone. This backbone provides both universal connectivity locally and a single point to attach wide-area car-

rier services to connect the premises with other locations. Obviously, there's money to be made selling backbone technology, and all LAN vendors would like to ensure that they get a big piece of

The backbone strategy that has the most credibility with users today is the "collapsed backbone," a premises internetworking architecture that connects all the work group LANs on the premises into a big box that provides a high-speed path for LAN-to-LAN traffic. Exactly

what type of product this big box is depends on which type of vendor you talk to.

"It connects LANs, so it's a router," is the cry of router vendors such as Cisco Systems, Inc. Since few users can afford 100K packet/sec wide-area services, it's pretty clear that Cisco's 7000 high-end router is targeted, at least in part, at the collapsed backbone

"It terminates LAN segments in a structured wiring plan, so it's a hub," is the opposing view, which hub market leader SynOptics Communications, Inc. has raised with its LattisNet System 5000 hub, which many see as a move to counter high-end routers (NW, Sept. 13, page 1).

Users, already dizzy from debates about the pros and cons of carrier services, 100M bit/sec LAN technology, and other networking and internetworking issues, now have to decide whether to collapse their backbones into a hub or a router.

Before making that decision, users should examine the state of hub use within the enterprise. The only kind of hub that really makes sense as a collapsed backbone platform is a switching hub, such as the SynOptics System 5000. Switching hubs establish a kind of "virtual media" whose capacity can far exceed the technical limitations of real LAN cabling. The 5000 offers nearly 2G bytes of total traffic handling for work stations and servers whose individual adapters are limited to 10M, 16M or 100M bit/sec.

Switching hubs also normally provide a hub-tohub interface, a high-speed channel often based on fiber optics that effectively extends the hub's backplane, creating a virtual hub that spans multiple floors and multiple work groups. Within this virtual hub architecture, all stations appear to be on a common LAN and no bridging or routing is required for connection. Users who have hubs in place, but not switching hubs with this kind of backplane extension, cannot really achieve a collapsed backbone based on their hub architecture — unless they buy new hubs.

Routers offer a more generalized strategy for creating collapsed backbones, because they can link any type of LAN and any type of hub. For collapsed backplane applications of routers, the router's packet/sec rate is critical, since this rate will determine the effective backplane capacity. If a router does not provide a switching capacity in gigabits per second, multiply the packet/sec rate by 12,800 (the number of bits in an

Ethernet packet) for a benchmark number. Routers can also provide the widearea interconnection of the premises LAN through the same device (some hub vendors will offer integral router cards, but these will never have the capacity of a stand-alone router).

The great Asynchronous Transfer Mode (ATM) debate is intruding on the backbone issue, as it is on many of today's networking issues. Users planning to deploy ATM services to desktops are likely to rely on ATM hubs as an ele-

ment in this plan. If these hubs are interconnected on the premises through other ATM switches or hubs, it will be possible to preserve the full range of ATM classes of service (voice, data and video services) for future use. Because routers are inherently data devices, the use of a router to create a collapsed backbone may limit connections through the backbone to

ATM LANs, connected via ATM carrier services, might eventually create a kind of internetwork in which routers play no role at all. But given the price of ATM LAN adapters today (averaging \$3,000 per Extended Industry Standard Architecture adapter), old-fashioned LAN technology is going to be a part of most of our networks for a long time.

Routers with ATM interfaces will be required to link ATM LANs with traditional LANs, and backbone routers are a logical place to provide this kind of facil-

As usual, there is no clear answer to the "Which is best?" question. Many users are going to decide their collapsed backbone architecture by accident, as a result of purchases they make in the work groups and in the horizontal wiring systems. That's a bad way to make what may be a critical technical decision.

Many users are also likely to invest in low-end nonswitching hubs without realizing that these products offer no greater value than shared media LANs in creating a hub-centric collapsed backbone. The only way to be sure that a lot of that new LAN investment doesn't end up in the salvage yard is to plan for LAN evolution based on the service requirements of the

Nolle is president of CIMI Corp., a technology assessment firm located in Voorhees, N.J. He can be reached at (609) 753-0004 or via MCI Mail at 349-5845.

Send us letters!

Have you seen an article in Network World with which you strongly disagree or heartily concur? If so, tell us what you think by calling the Letters to the Editor Hotline at (800) 622-1108, Ext. 461.

Letters

Show of support

I could not agree more with David Bernard Ciolkowski's column, "Novell: Improve customer support" (Oct. 4, page 46). My only regret is that he did not emphasize enough a major reason for Microsoft Corp.'s success and Novell, Inc.'s eventual failure: developer support.

Microsoft has obviously realized that a key to establishing and mainlining dominance in software markets is to maintain good developer relations. Novell, on the other hand, seems to feel that the key to its success is milking every possible dollar it can from its products while complaining that Microsoft isn't playing

Recently, I had a problem using NetWare with Windows. It was a developer support issue, and I

needed some very simple information on how to make an application program interface (API) call to the NetWare dynamic link library.

The problem was caused by a "feature" of NetWare that is incompatibile with Windows so I posted a message on Novell's CompuServe forum. Looking through messages with titles like "Hello, is anybody there?" made me wonder if it was worth my time, but remarkably, I got an answer. Novell technical support told me that, to get the information, I would have to buy their software developer's kit (SDK).

We run a small business and spent more than \$3,000 on Novell's product, and now that I need a simple question answered, all they can tell me is to buy their \$500 SDK. Contrast this with Microsoft. Anyone can go to the bookstore and buy any of several Windows programming books and get all the published API calls for less than \$50 (this is actually free information) no SDK required. If you know how, you can use any product capable of calling external functions and program Windows with this information.

Microsoft's products are far from perfect, but at least the headaches I get from using them are smaller than my Novell headaches. If I sent Novell a bill for all the time I've wasted working around problems with their products, I'd probably be one of their highest-paid employees.

> Will Waller Information manager J.S. International Burlingame, Calif.

Keying in on DSS

We have been following with interest your commendable coverage of developments affecting the government's pending Digital Signature Standard (DSS). Your ability to distill a complex subject into a meaningful story is a service to your readers.

Unfortunately, your recent article, "Opposition strong to govern licensing plan," (Sept. 20, page 12) departed from your past practice of checking the facts with different points of view — in this instance, with Public Key Partners, Inc. (PKP). Considering some of the outlandish statements attributed to other parties concerning PKP's position, we are naturally disappointed that we were not given an opportunity to comment. Had you done so, you would have learned the following:

First, why should PKP be compensated in the form of this crosslicense? The answer is simple: PKP represents the inventors and universities responsible for the fundamental invention from which DSS is derived. The comments you quote represent the self-serving viewpoint of those parties who seek to profit from the commercialization of this standard without compensating its

Second, PKP has been wrongly characterized as merely a licensing company, which does not commercialize the technology by manufacturing equipment or providing services. This too is incorrect.

PKP's general partners are the two undisputed pioneers in commercial public key cryptography — RSA Data Security, Inc. and Cylink Corp. Since 1982, RSA has introduced its public key software encryption products to more than 2 million users, while Cylink has led the commercial market for public key hardware encryptors since 1985.

PKP's partners, by incorporating DSS into their existing products and customer base, can rapidly disseminate this technology to millions of users while at the same time guaranteeing its availability to all other vendors under uniform, fair licensing terms. Who else can make this promise?

Third, the quote from one European smart-card vendor fails to disclose its affiliate's licensing terms for their own smart-card patents, which terms require execution fees of several hundreds of thousands of dollars and royalties several times those proposed by PKP.

Lastly, some of the comments have simply misread the proposal. The \$1 certificate fee does not require, as some of the comments suggest, that such a fee be paid every time a signature is executed. Rather, the certificate fee is a notarial instrument that allows the same signature to be applied many, even millions, of times.

PKP has struggled single-handedly for more than three years to secure the remuneration justly deserved by public key's inventors, patent holders and pioneers. This latest episode reflects the struggle between government and industry for finally allocating this responsi-

See Letters, page 58

I would like to comment on Michael Cooney's article "APPN tops TCP/IP in performance faceoff" (Oct. 11, page 1). I was not as surprised by the results of the tests as the author was. The "conventional wisdom" that Advanced Peer-to-Peer Networking (APPN) won't measure up to Transmission Control Protocol/ Internet Protocol in terms of performance seems to be the tendency to undermine IBM's products and architectures.

As an evolutional development of Systems Network Architecture, APPN's design points were high performance and predictable response times vs. TCP/IP's design point of easy anyto-any connectivity. Therefore, connection-oriented APPN obviously out-performed TCP/IP.

As far as the quote from Anura Guruge that testing with Intermediate Session Routing between APPN nodes would have slowed performance: If ISR had been used, both APPN and TCP/IP would have suffered from performance degradation, which (as was mentioned by the author) is significantly improved by APPN's High Performance Routing. In this case, TCP/IP would have been especially negatively affected during high traffic loads, causing packets drops and subsequent retransmissions.

The only test result that was a really big surprise to me was APPN's unbelievably superb ability to utilize a T-1 link with 3M

Surprising result bit/sec. I was wondering about the internal physics of this phenomenon. Or was it just a typo?

> Eddie Rabinovitch Senior systems programmer Dreyfus Corp. Jersey City, N.J.

More questions

Concerning the article "APPN tops TCP/IP in performace faceoff,"I found part of the information presented confusing. In the section where Mr. Cooney speaks to the performance measurements used in a simulated T-1 environment, the article states that Advanced Peer-to-Peer Networking achieved a throughput of about 3M bit/sec and Transmission Control Protocol/Internet Protocol about 1.5M bit/sec when routing two Token Rings. Two questions arise from this:

(1) What does a "simulated" T-1 environment mean?

(2) How can APPN achieve throughput of nearly 3M bit/sec on a T-1 connection?

And for that matter, how can TCP/IP operate so close to the maximum throughput of a T-1 connection?

Gregg Lenentine Computer/networking specialist Tricare Tidewater Norfolk, Va.

A puzzlement

Michael Cooney's article about APPN vs. TCP/IP fails to

take into account that the maximum data transmission size in any TCP/IP packet is 1,500 bytes, while Token Ring can supposedly handle any packet size. It depends upon how well APPN packs data into Token-Ring packets.

As noted, routing shows a large decrease in performance with APPN. It might be instructive, then, to see what's going on in the network regarding packet sizes and data fragmentation.

I am puzzled about the 50% and 90% congestion level remarks, as Token Ring is essentially a time-division multiplexed channel and should, by design, show very little degradation at such traffic levels.

> Craig Paul **WAN** specialist University of Kansas Computer Center Lawrence, Kan.

Editor's response: The InterLAB test bed did not have a true T-1 link, so the lab used a "simulated" T-1, which was a 4M-bit/sec Token Ring loaded down with frames to represent a T-1 link. The result, however, let the data pass beyond a true T-1 1.544M bit/sec limitation.

Congestion, again, was simulated and was factored into the overall throughput results. The exact congestion performance figures were not available to Network World. If you'd like more technical detail on these tests, please call Kevin Tolly of InterLAB at (908) 528-3300 or Tom Routt of Vedacom Corp. at (206) 527-3434.

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The Pa

By BOB WALLACE

Carriers are prepping ATM services as users wait to take them for a test drive.

Just as consumers wouldn't buy a new car without checking its sticker price and taking it for a test drive, network managers can't be expected to buy Asynchronous Transfer Mode (ATM) services without knowing what they will cost and how they will run.

However, with ATM services just now emerging, users have little or no feel for ATM service price and performance. Without such basic information, users are finding it difficult to compare emerging ATM services to existing high-speed offerings.

Thus far, all users have to go on is what they have heard from standards bodies, carriers and other industry pundits that herald ATM as the technology that will combine voice, data and video traffic at a

7	Sprint's ATM performance	objectives
5	End-to-end Asynchronous Transfer Mode (ATM) link availability	99.95%
l 9	Point of presence (POP)-to-POP availability	99.98%
	Maximum end-to-end cell delay:	
3	Class A service	50-70 msec
3	Class C service	Less than 50 msec
1	Based on laboratory tests. Services offered fiber rings.	d over survivable
	GRAPHIC BY SUSAN SLATER SOURCE: SPRINT CO	RP., KANSAS CITY, MO.

lower cost and more efficiently than existing dedicated and switched offerings.

The Telecommunication Standardization Sector, for instance, tells users that ATM services will break down into four distinct classes (see graphic, page 46).

Each class service can run at different speeds. Class A is a connection-oriented, constant bit rate service designed for voice and clear channel data transmission, which is currently the domain of T-carrier services, including fractional T-1, T-1, fractional T-3 and T-3. With ATM Class A, transmission resources are allocated from one end of the network to the other.

Class B is a connection-oriented, variable bit rate service designed for packetized video — an application that has yet to emerge. There is no clear comparison between Class B service and any existing offering.

Class C is a connection-oriented, variable bit rate service that is akin to today's frame relay services, but it offers less delay than frame relay. While a frame relay switch accumulates all frames in a transmission before beginning to send any of them, ATM Class C service encapsulates frames into cells and sends those cells as soon as they begin to arrive at the switch.

Class D is a connectionless, variable bit rate service similar to Switched Multimegabit Data Service (SMDS).

So if ATM services are similar to existing highspeed services and occasionaly less efficient, why will users buy it? Because it cuts end-to-end delay, making it a higher quality service.

Further, "Users will buy ATM if it offers bandwidth in an increment not currently available or at a lower cost than what's out there today," says Tom Nolle, president of CIMI Corp., a Voorhees, N.J., consulting and research firm.

But many carriers claim ATM won't be used to carry voice for some time. And with the gradual emergence of video, will most users be able to justify the service based solely on data and local-area network interconnection applications?

"It's difficult to tell," Nolle says.

For ATM service to succeed, carriers must address

Continued on page 46



STOCK IN IN

G ATM

By SKIP MACASKILL

Like the owners of starter homes that have become too small for growing families, many users feel their local-area networks are busting at the seams from new, bandwidth-hungry applications.

And as more people vie for limited resources, both network managers and starter homeowners face a similar dilemma.

Do they abandon what they have for something new? Or do they add onto what they already have, leveraging knowledge of their existing environment and hoping the addition will seamlessly meld in with the current one?

That's where the commonalty ends. Network managers who opt for a new environment will undoubtedly explore high capacity options such as Asynchronous Transfer Mode (ATM) technology, 100M bit/sec Ethernet and Fiber Distributed Data Interface.

For many network managers facing this decision, ATM is a wild card. The technology promises to provide improved performance over existing Ethernet and token-ring LANs. Yet it is not entirely clear whether a move to ATM will require net managers to buy a whole new LAN infrastructure, including wiring, adapter boards and software, or simply swap out such components as workstation- or hub-based network interface boards to achieve ATM performance.

TECHNOLOGY OVERVIEW

In a true ATM environment, workstations and LAN servers are linked directly to a hub or ATM switch in a star topology. The ATM hub or switch may also support a few traditional shared media access LAN segments such as Ethernet. Geographically dispersed ATM-based LAN hubs and switches must be linked via wide-area ATM services.

When traffic is transmitted between local- or wide-area nodes, ATM technology chunks data into standard 53-byte cells, which are then switched by the ATM switch or hub.

Proposals for a variety of ATM data rates are currently under development and range from a low of 25M bit/sec to a high of 622M bit/sec, with gigabit-speed specifications soon to follow. ATM is currently a fiber-based technology, but copper-based implementations are being explored. According to industry experts, ATM running over copper wire could reach speeds of 155M bit/sec, but fiber will be required for higher speeds.

The variance in ATM wiring and speed is a potential stumbling block for network managers. And there are no easy answers.

"I've got some concern about the continued technology fragmentation that's going on in the debate about using low-speed or high-speed ATM," said Sam Shuler, a principal in the Dallas office of The Yankee Group. "We can't continue to introduce significant variations on the same set of basic choices. Most network managers and operations people have too many choices today, and all of the options are not of significant value."

In order to integrate traditional Ethernet, token-ring and FDDI networks into this environment, ATM adapters or hub modules with segmentation and reassembly (SAR) technology can be used. A device with SAR capability can accept a traditional Ethernet packet and cut it up into a series of 53-byte ATM cells. After being switched to their destination, the cells can then be converted to their original frame formats.

Despite the confusion, ATM's promised benefits are easiest to envision for a high-performance work group of engineers running bandwidth-inten-

Continued on page 49



As they outgrow existing LANs, users must decide if ATM is the answer.

Fast Ethernet 63% Local ATM 54% FDDI over copper 53% FDDI 52%

Order of preference

Switched Ethernet 44%

Of the 256 net professionals surveyed by Sage Network Research, 125 said they were likely to evaluate some

high-speed LAN technology,

with fast Ethernet leading

the list of choices.

SOURCE: SAGE NETWORK
RESEARCH, NEWTON, MASS.
GRAPHIC BY SUSAN SLATER

Continued from page 44

a series of key issues.

In an effort to attract users to ATM, carriers are comparing their ATM service pricing to T-3 rates, claiming that the new services are anywhere from 25% to 75% cheaper than T-3 links. Most major long-haul carriers have said they will offer ATM at T-3 speeds, with higher speeds to gradually follow.

'These comparisons aren't too helpful to users because there aren't a whole lot of users out there that can justify T-3 to begin with,' Nolle says. "Users want specifics on pricing, plain and simple."

The ATM Forum is forging ahead with a specification delineating T-1 ATM. "We're working with other companies to drive a standard here," says Dave Nelsen, ATM product manager at AT&T, which is a member of the ATM Forum. "I'd be surprised if we didn't have one a year from now."

WHAT'S AVAILABLE

What's available today is a 45M bit/sec Class A ATM offering from Sprint Corp. The initial interexchange carrier ATM offering is provided through TRW, Inc.'s BAS-2010 cell relay switches in Realto, Calif., Chicago and

ATM standards defined by CCITT					
	Class A constant bit rate service		Class C connection- oriented data service	Class D connection- less data service	
Applications	Voice clear channel	Packet video	. D	ata	
Connection mode	(Connection-oriented	d	Connection-less	
Bit rate	Constant		Variable		
Performance	Requires cons	sistant delay	Variability acceptable		
GRAPHIC BY SUSAI	J. CHAMPENY		So	OURCE: AT&T, BASKING RIDGE, N.J.	

Early ATM users will need T-3 local access to reach their long-distance carrier's points of presence because local carriers don't yet offer ATM service. T-3 access is expensive where available. "Users are going to get killed on local T-3 access," says Daniel Briere, president of TeleChoice, Inc., a Montclair, N.J., consultancy. "This would provide a golden opportunity for alternative access providers. They could cut rates for their T-3 access links."

Offering low-speed ATM service running at T-1 speed could open up the market for the service to the masses, primarily for users that don't have high-end bandwidth-hog applica-

Users divulge wide area **ATM implementation plans:**

We will start with ATM for campuswide applications and then ultimately move it to wide-area applications. The time frame for starting to do this is by 1994 or 1995.

We will implement it sometime soon for high-speed data transfer."

We will implement ATM within the next three to five years and use it for video applications."

We will implement ATM, but it is far away. I'm not sure exactly when we will implement it because standards have to be developed first. We are getting frame relay

Users sitting on the wide area ATM fence say:

 $^{\prime\prime}I$ t is too early to say. We are in a country that didn't develop ISDN and now wants to jump to ATM. Frame relay is going to meet people's needs for a long time.

Users cite reasons for not implementing wide area ATM:

We're struggling with frame relay right now. We'll look at ATM down the road."

"We have talked about it, but there are no immediate plans due to budget cuts. Also, there is no need for that high bandwidth."

"Our network is not that large. We have digital leased lines, and we may go to frame

ATM = Asynchronous Transfer Mode Responses are based on a survey of 100 readers. SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

Relay, Md. Sprint plans to install TRW switches in Stockton, Calif., and Fort Worth, Texas, in the first quarter of 1994.

The first three switches are currently networked using multiple T-3 lines, which will eventually be replaced by a yet-to-be-determined vendor's Synchronous Optical Network (SONET) fiber-based transmission system. The same will hold true for each additional TRW switch.

"TRW is giving us an [Optical Carrier]-3 capability by year end," says Greg Crosby, Sprint's director of data product management. "So we're looking to move to a SONET backbone network by mid-1994."

Crosby says Sprint plans to roll out an OC-3 ATM service in mid-1994 and is eyeing an OC-12 offering operating at 622M bit/sec, as well.

The carrier says its deployment beyond the first five cell switches will be based on user demand for ATM. In the meantime, Sprint will back-haul customer traffic to its TRW switches.

'Carriers typically back-haul traffic to a limited number of switches early on in a service deployment when they aren't sure how demand for a service will go," said CIMI's Nolle. "They'll do this to keep costs down early on. It's not a problem because the carriers have lots of excess trunk capacity."

Crosby says Sprint's Class A offering will be sold to support videoconferencing rather

"We don't see voice coming on ATM for at least a couple of years," Crosby says. "Virtual private networks are operating well and offer very low-cost transport for voice. We need to see more willingness on the part of users to put voice on ATM."

Sprint's first ATM customer, Hughes Aircraft Co., will not run voice over the carrier's ATM service (NW, Aug. 30, page 1).

"Video is delay-sensitive and needs to have a sustained bandwidth to eliminate the problem of jitter," Crosby says. "We'll go ahead and define a logical link across the network so that the bandwidth is there when you're ready to begin a video call."

Sprint sees demand for video over Class A ATM service. "Several users have told us that they'd prefer to support videoconferencing over a constant bit rate service rather than use existing services and burst up and down."

The carrier is selling a Class C service,

which provides some variability in performance, as a way to support data transfer, imaging and LAN interconnection applications.

Organizations that subscribe to Sprint's ATM service can define how they want each site to pay for the service.

"We let users decide how they want to pay for the service on a per-site basis," Crosby says. "They can pay a flat rate, a usage-based rate or both."

With the Sprint approach, large sites such as corporate headquarters or data centers with heavy data communications needs could choose to pay a flat rate, while smaller sites such as branch offices with occasional data communications needs could pay only for

Sprint has shown some interest in offering a Class D connectionless ATM service for data transmission.

"We will transport traffic from connectionless services, like SMDS, over our ATM network, probably in late 1994," Crosby says. "This traffic will most likely be converted into cells by the RBHCs and passed to us through a broadband intercarrier interface on a local carrier's ATM switch."

Although Sprint has been aggressive in promoting ATM, the company admits that it's concerned about the dearth of commercially available customer premises equipment that will work with the service.

"It's a legitimate concern," Crosby says. "Like with any new service, there's some vendors that are further ahead of others when it comes to adding interfaces to their products. Some won't have their products ready until mid-1994."

Crosby's talking about equipment that falls into three categories; routers, local ATM switches and data service unit/channel service units (CSU).

To address this key issue, Sprint has launched an equipment certification program under which customer premises equipment is tested to see if it interoperates with Sprint's ATM network.

The carrier has already certified Fore Systems, Inc.'s ATM hub, Digital Link Corp.'s CSUs and Cisco Systems, Inc.'s routers for use with its ATM services, and is currently testing other vendors' gear. "We'll have a pretty long list of vendors by the end of 1994," Crosby says.

Sprint has decided to resell equipment that passes the tests. "We don't believe that we can just sell an ATM pipe across the network," Crosby says. "Users are looking for equipment, as well."

But what about users with non-ATM equipment that want to use Sprint's ATM service?

The carrier says that in a router environment, users need only install a Digital Link ATM CSU

between the router and the Sprint ATM network. The router feeds data traffic to the CSU, which converts it to ATM and passes it to the

Sprint is the first interexchange carrier to release ATM service performance data (see graphic, page 44).

WILTEL'S PLAN

Although Sprint beat WilTel to the punch by announcing immediate availability of ATM

service, WilTel has announced a much longer term ATM deployment plan.

WilTel's 45M bit/sec ATM service is based on NEC America, Inc.'s NEAX 61E cell relay switches that will be in eight cities by year end. WilTel will deploy switches in eight more cities by 1994 and another seven in 1995, for a total of 23 cities (see graphic,

this page). Like Sprint, Wil-Tel has linked its cell switches with multiple T-3s and plans to

upgrade those to

SONET links in 1994. WilTel plans to first offer Class B service, which requires constant delay, and Class C service, HECKART which accepts some

WilTel's ATM

deployment plans

The carrier will install Asynchronous Transfer Mode (ATM) switches in

the following cities:

Los Angeles

Washington, D.C.

Des Moines, Iowa

1993

Atlanta

Dallas

Denver

New York

Phoenix

Boston

Houston

Seattle

Detroit

1995

Nashville

Orlando, Fla.

San Francisco

Albuquerque, N.M.

Jacksonville, Fla.

Kansas City, Mo.

SOURCE: WILTEL, TULSA

Philadelphia

Raleigh, N.C.

San Diego

1994

Chicago



variability from a performance standpoint. The carrier doesn't see any pressing need for Class A service for voice and video.

Instead, WilTel sees voice traffic being handled over existing virtual networks and little demand for video transmission. "Today's virtual private networks are sophisticated, ubiquitous and priced very attractively," says Christine Heckart, WilTel's marketing manager for broadband services. "ATM can't hope to match that in the near term."

WilTel sees data applications as the prime driver for ATM service, with the possibility of video coming on as early as next year, but probably after that.

Heckart sees Class B service being used by companies with applications that need a

steady minimum bandwdith and can't tolerate delay, while users with bursty LAN interconnection applications will opt for

WilTel has not yet finalized pricing for its ATM service but will structure pricing along the same line as Sprint, meaning firms could pick flat rate- or usage-based pricing, or a combination of both, on a per-site basis. Pricing will also vary based on the application.

WilTel also plans to package its ATM service with special customer premises equipment to users with mainframe channel extension applications and later for LAN interconnection.

"We learned a lesson with frame relay," says Heckart, whose company became the first to offer the service in March 1991. "We tried to sell the service alone without offering the equipment customers needed to use it. And that didn't work."

The carrier has already cre ated an equipment certification program under which it certifies equipment that works with its

ATM offering. The two companies that provide channel extension equipment for WilTel's ATM-based channel networking package, Network Systems Corp. and Computer Network Technology Corp., have already passed the

'The certification program works for Wil-Tel and for users," says Heckart. "We find out what's out there, what works and who we should partner with to offer packaged solu-

Continued on page 55

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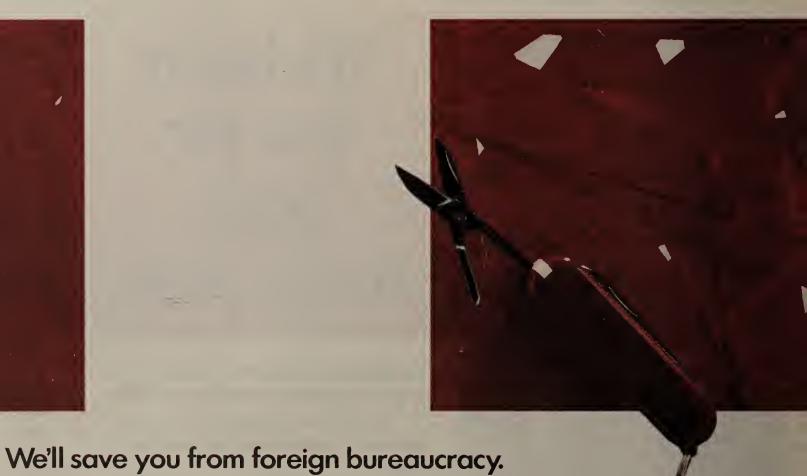












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LANs

Continued from page 45

sive applications.

"Initially, users will have to focus their high-bandwidth in the local work group arena because the net infrastructure to go beyond that is simply not in place anyway," said Fred McClimans, program director at Gartner Group, Inc., a consultancy in Stamford, Conn.

However, some long-haul carriers such as Sprint Corp. have announced ATM-based



wide-area services. Other long-distance companies such as AT&T and MCI Communications Corp. are planning to roll out wide-area ATM services (see accompanying story).

If it is to be the rage of local- and wide-area networking, ATM must fend off a variety of high-speed choices, including 100M bit/sec Ethernet, the emerging 100M bit/sec token ring, 100M bit/sec FDDI over fiber and FDDI over copper, as well as switched Ethernet and token ring that can deliver 10M and 16M bit/sec of

dedicated bandwidth to the desktop, respec-

To its advantage, ATM stacks up well against its high-speed alternatives, says Kathryn Korostoff, principal of Sage Network Research, a market research firm in Newton, Mass. "Local ATM is an extremely efficient and flexible technology, and the standards are still evolving, so you know there will be new features available. The other thing with local ATM is that it can scale into the gigabit-speed range, depending on product implementation, while the alternatives max out at 100M bit/sec."

Korostoff says the speed difference should be put in proper perspective. "Some people argue that ATM has a higher bandwidth potential than FDDI, but that is a far too simplistic argument. FDDI has some very key features such as dual homing and Station Management - that are related to reliability, network management and control that local ATM doesn't have. Depending on your configuration and how critical your data is, there may be some parts of the organization that really need FDDI's reliability and control. Where there is simply a need for real speed, local ATM will be abetter choice."

ATM's scalability also gives it a distinct advantage, McClimans says."When we look at 100M bit/sec Ethernet and copper-based FDDI, we're talking about existing technologies that have a finite cap. They're not easily scalable beyond that 100M bit/sec barrier. The beauty of ATM is that it gives you the infrastructure that can go from the LAN across the

WAN seamlessly, while scaling nicely from 25M [bit/sec] to, ultimately, gigabit speeds."

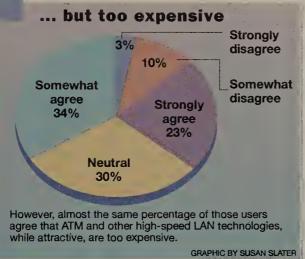
The impact ATM will have on the LAN is a multifaceted issue, actually raising more questions than it answers in some areas. One fact, however, is easily agreed on: The technology will require significant changes to the network's physical infrastructure.

INFRASTRUCTURE IMPACT

Adopting LAN-based ATM will require users to at least buy new adapter cards for workstations, servers and LAN hubs. It could possibly do even more financial damage by requiring users to buy new hubs or switches that have been designed to handle ATM

Adopting a true ATM environment will also result in having to pull fiber cable to the desktop. To achieve the highest speed possible, ATM should be run over fiber cabling and operate in a star topology.

If users simply want more throughput between LAN nodes, then opting for a hub that supports switched Ethernet is a good choice, Korostoff says. A switched Ethernet hub works like a circuit switch. Each LAN node is connected to the Ethernet switching hub in a star



When nodes must communicate, the switch provides a clear 10M bit/sec channel between them.

But Korostoff found users that are looking more long term have other alternatives under consideration. The alternatives were uncovered when 256 users contacted by Korostoff and Robbie Forkish of RFTC, Inc. for their study, "High Speed LAN Market Analysis: Customer Attitudes, Selection Criteria & Buying Intentions."

"If you're going to get involved in rewiring in a large organization, that is a substantial investment," Korostoff says. "Users want a structured wiring scheme that will last between five and 10 years because they don't want to be faced with rewiring every two years as they go from one interim solution to

The University of California at Los Angeles was one organization that a few years ago saw the handwriting on the wall. According to Bill Iebson, director of computing for the graduate school of architecture and urban planning and manager of UCLA's Visualization Center, the school installed 144 fiber-optic backbones across the campus, with a minimum of 24 and a maximum of 48 fiber drops into every building. While 90% of that fiber is not yet carrying traffic, the basic infrastructure is in place for

"The decision to pull the fiber was part of a campuswide decision process to future proof our structured wiring plan, but we had no idea that ATM was coming down the road at the time," he said. "We just knew that fiber was the way to go."

While users such as Jebson who are building new nets or adding segments onto existing infrastructures are considering pulling fiber in an effort to be well-positioned for future technologies, users with copper-based structured wiring plans have several options to get them to the next step in high-speed networking.

In addition to copper-based standards for ATM, high-speed alternatives, such as FDDI over copper and fast Ethernet and token ring, have been geared to take advantage of the existing Category 3, 4 and 5 unshielded twisted-pair wiring environments, as well as IBM Type 1 and 2 shielded twisted-pair

When the scope of physical change a network must undergo becomes apparent, it will cause net managers to actually rethink their approach to networking, according to Charlie Robbins, director of data communications research at Aberdeen Group, Inc., a consultancy in Boston.

'ATM is going to force people to think about how they approach their networks and, ultimately, their businesses," he said. "The thinking has to change because the barriers that used to exist between networks are being knocked down with the promise of ATM and the virtual networking capability it brings with it. Corporations must start thinking about sharing information logically rather then physically.

Robbins also pointed out that users should be wary of vendor claims that the changes required to move to ATM will be seamless and painfree. "I'm very skeptical that these various ATM strategies will really work because I've never seen any strategy work the way it was supposed to," he said.

'The move to ATM is going to require some portion of a forklift upgrade. There is an impact here, and it is not seamless. Seamlessness can only be achieved when there is no installed base to worry about."

A commitment to ATM will also have a snowball effect, McClimans warned. Users can make the needed changes to accommodate

IMPACT ON APPLICATIONS

The arrival of local ATM will also bring about changes in the way users employ the network since the added bandwidth and power can support a new class of sophisticated applications that will help users be more efficient and productive.

ATM will support any bandwidth-intensive and time-sensitive application such as threedimensional computer-aided design and manufacturing, multimedia, compound documents, video electronic mail, image databases and CD jukeboxes, Korostoff says. "It's easy to argue that some of these applications haven't been fully developed and users don't have the need for them now, but they are starting to roll out and will become more important as network needs change and grow."

For the UCLA crowd, the ability to dynamically allocate a certain amount of bandwidth and have it guaranteed from one end of a connection to another puts it head and shoulders above the alternatives.

"We do a lot of visualization here at UCLA, meaning we need to move huge chunks of integrated data, video and image," Jebson says. "In order to do that, we need dedicated bandwidth, and that's what ATM can provide. I'm unaware of any other technology that allows you to request X-amount of bandwidth from point-to-point and have it guaranteed."

ATM can provide this capability because it handles call setups on the fly. When a switch receives a cell, it checks the destination address and sets up a dedicated path through the network. These connections can either be switched virtual circuits, where the connection is set up and torn down after every transmisssion, or permanent virtual circuits, where a fixed logical channel between two nodes is defined once and maintained each time those nodes communicate.

New, high-powered applications have raised the question of whether ATM will have a significant impact on existing network operating systems (NOS), as well. According to McClimans, there will be two waves of ATM winners in regards to that issue. The initial ATM providers will be the major networking

Sizing up the competition				
Technology	Availability	Upgrade requirements	Per-port hub/ switch price	Adapter cost
Local Asynchronous Transfer Mode	Now	New adapters, hub modules and fiber cabling required for speeds above 155M bit/sec, or unshielded twisted-pair (UTP) wiring for speeds between 25M and 155M bit/sec.	\$2,000+	\$1,200+
Fast Ethernet	Mid-1994	New adapters, hub modules and Category 3 or 5 UTP wiring for speeds of 100M bit/sec.	Approximately twice as much as standard Ethernet prices	Approximately twice as much as standard Ethernet prices
FDDI	Now	New adapters, hub modules and fiber cabling for speeds of 100M bit/sec.	\$700-\$1,000	\$900-\$1,200
FDDI over copper	Now	New adapters, hub modules and Category 5 UTP wiring for speeds of 100M bit/sec.	\$600-\$800	\$500-\$600
Switched Ethernet	Now	New hub modules; will provide dedicated 10M bit/sec connections.	\$300-\$1,500	No changes to existing Ethernet modules required
GRAPHIC BY SUSAN SLATER SOURCE: ABERDEEN GROUP, INC., BOSTON				

ATM, but they should be prepared to up that investment once word gets out.

"If you provide more bandwidth on the LAN, more people will want to use it and then expect it to be carried over into all other aspects on the network, including the wide area," he

"It's the Kevin Costner approach to networking: If you build it, they will come."

players who have huge installed bases, which will force them to keep most of their NOSes intact to keep disruption and change to a mini-

In about two years, however, new players will emerge who have no allegiance to any users because they have no installed base to protect. "There is the potential for a very different winner who has the luxury to look at the

Continued on page 50

Even if these ATM-oriented applications surface, the percentage of the market that will make use of them is pretty small, McClimans added.

"There is only about 10% to 15% of the market that will ever need the power of ATM down to the desktop," he said.

IMPACT ON PERFORMANCE

A physical infrastructure that has been altered for ATM and a new class of applications that are bandwidth-hungry begs the obvious question of network performance: Once the LAN has been outfitted for ATM, how will it

Unfortunately for users, this question cannot be answered. While proposed rates for ATM range from 25M to 622M bit/sec, no one is sure what strains that level of performance will put on the LAN.

The reason for the uncertainty regarding performance is related to the amount of questions that still remain to be answered. "Issues of congestion and blocking, for example, are still on the table," Robbins says. "These are the critical technical issues that are a little esoteric but could kill the networks once ATM gets out of pilot phase and into real production.'

Yet everyone agrees that the performance ATM can bring to the whole infrastructure and architecture will significantly change the way users think about their business.

"The technology is still in a stage where we don't fully understand what the potential can be in terms of the whole network landscape," Yankee Group's Shuler says. "Today, we design, build and architect networks with bounds, constraints and caps in mind, which prohibit innovation, application development and business reengineering. While ATM promises to remove those barriers, we just don't know what will ultimately happen."

Because no one is quite sure how ATM will affect the network or react with existing network technologies, initial installations will likely run in parallel with existing nets or in small work groups attached to the periphery of a larger net.

"Given the price points that ATM has today as well as the marginal track record we have of pragmatically introducing technology from a

Users divulge ATM LAN implementation plans:

We already have ATM in use in the

"We will implement ATM by 1997 and use it for multimedia applications.

"We will implement it within two to three years. It depends on new wiring plans, but it will be implemented by at least 1995 or 1996. The technology will be mature by then. We will have fiber by 1995 or so. By then, people will be doing imaging, and we will need greater bandwidth.

 $^{\prime\prime}W$ e will implement it in 12 months to speed up our FDDI backbone.

Users sitting on the ATM LAN fence say:

We don't fully understand the applications and uses of ATM yet."

"There is no need for it yet. We only have 70 people on our LAN."

Users cite reasons for not implementing ATM LANs:

It's far off. There is no proven need for end users right now. It is too costly. We are satisfied with what we have now."

It looks interesting, but I haven't yet figured out how we would use it.

"We are a cohesive location Everything is within reach of fiber. Fiber is here now, and ATM is something off in the future."

ATM = Asynchronous Transfer Mode Responses are based on a survey of 100 readers. SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

user's perspective in a fully consumable form, ATM — by default — will be introduced in the LAN in pockets," Shuler says. "We'll first see ATM where the users will get the maximum amount of value with the minimal amount of aberrations in their operation. That's the bottom line. Users are going to go for the simplest set of options with the highest level of payback tied to them."

Even the users who are committed to ATM, like UCLA's Jebson, are unsure of the technology's ramifications. "We know what we want to accomplish, but we haven't sorted out what the appropriate design or structure of the system should be. We're pretty much going to run the ATM net separately from the existing net in the beginning because it's going to be a trial balloon. Our campus backbone carries far too much important data - both administrative and academic — for us to experiment with

Continued on page 54

Quotes speak louder than headlines

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Glenn Long Manager, Data Engineering Group Westinghouse Communications





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50 NETWORK WORLD NOVEMBER 1, 1993

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Continued from page 50

Furthermore, branching out of those work groups and into the campus backbone will require some type of interoperability between various vendors' ATM equipment. But again, the user is venturing into unknown waters. Because standards are still emerging for the technology, no vendor can safely claim interoperability with another. That situation will delay Jebson from integrating his parallel ATM net with his existing net.

Jebson's architecture department is looking at ATM products from Fibermux Corp., while UCLA's medical center is evaluating gear from SynOptics Communications, Inc. Before either site chooses a vendor, the issue of interoperability must be addressed.

"We need to be able to communicate with the medical center because they're big users of the Visualization Center," Jebson says. "We have to figure out how this whole architecture is going to work together so that the Fibermux ATM can communicate with the SynOptics ATM. That may be an easy thing, but it may not be. It just isn't clear yet. It's going to come down to ensuring there is interoperability between different vendors' products or standardizing on one vendor to ensure that interoperability."

IMPACT ON BUDGETS

ATM, however, without exception, is more costly than the alternatives, forcing the user to decide whether any increase in performance is worth the increase in price.

"Understanding that ATM is still a year or two away from good, practical mass market implementations, you have to ask if it makes sense instead of upgrading my network now to go ahead and buy an interim solution," McClimans says. "Go buy a hub from Artel or a switch from Plaintree. Why? Because it's dirt cheap and gives you immediate performance. If you can use that for a year and then redeploy that device or write it off, then do it. It'll only cost you about \$5,000 and will give you a year to let ATM mature and prices drop."

"Everyone might not ever have three or four technologies in place, but five years from now, more than 50% of LAN environments will have at least two high-speed technologies installed," Kathryn Korostoff says.

While there are cutting-edge users who can justify the cost of ATM, the average user simply cannot, according to Aberdeen's Robbins. "Cost is the most prohibitive factor for the mainstream user," he said. "If I'm ABC Aircraft and can build and deliver an airplane seven days earlier than my competition because I'm using ATM, then it's easy to cost justify it even at \$10,000 per connection. However, even at the current \$2,000 per-connection level, it's untouchable for most users."

ATM prices need to fall dramatically, according to McClimans. "In the long run, this technology has to be under two times the cost of existing technology per connection in order for it to sell. If the typical 10M bit/sec Ethernet connection of a workstation adapter and hub card is around \$300, you really can't be over \$600. In fact, it would be better if you could be at \$400 or \$450. The ATM front won't be able to get to those levels soon [since the technology has not matured enough to generate volume purchases], but we're certainly seeing a strong

push for ATM to be price-competitive with copper-based FDDI." Pricing for FDDI currently runs between \$1,000 and \$2,000 per

Korostoff also pointed out that it's really not an either/or situation. "With more features comes more complexity, meaning the products cost more," she says. "My survey showed that most people are planning to use a combination of technologies, so it wouldn't be a matter of using ATM over FDDI. Users understand there are differences in features that are available from those technologies, and they are not fooled by simplistic comparisons that say

155M bit/sec is better than 100M bit/sec. There is a lot more to the decision-making process than just those things."

An engineering work group, for example, could use ATM for a computing-intensive CAD/CAM application it's running, while a finance group will use FDDI to have critical servers with invoice databases and accounting systems dual-homed for redundancy. The marketing department might have fast Ethernet or switched token ring in place to help coordination of an advertising promotion.

"Everyone might not ever have three or four technologies in place, but five years from now, more than 50% of LAN environments will have at least two high-speed technologies installed," Korostoff says.

The decision of buying a new ATM LAN or expanding an existing LAN will not be easy or simple. Depending on how important the network is to the business and what applications are in place, a short-term addition may be the best call. But as the network grows and the business needs change, a move to a new technology in the form of ATM may ultimately be warranted.

◆ MacAskill is a senior writer at Network World.

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Continued from page 46

tions. Users are assured that this equipment will work with Wiltel's service."

The carrier has installed NEC switches in its laboratories in Tulsa, Okla., and Houston, and linked them via T-3. "Users that want to simulate applications can give us one site and test the applications with our two lab sites," Heckart says. "They can get a feel as to how their application performs."

AT&T PREPS OFFERINGS

As Sprint and WilTel play the role of the early bird, AT&T will formally announce its ATM services before year end. The carrier plans to offer a T-3 ATM service over a network of StrataCom, Inc. BPX and AT&T GCNS-2000 cell relay switches, and recently said its service will go into a controlled introduction in the first half of next year, with general availability slated for the second half of 1994.

AT&T's Nelsen says the carrier will initially offer Class A and Class C services. He also says AT&T may eventually add Class B and Class D offerings but would not say when.

The carrier sees Class A service as a great fit for voice and video traffic while banking on Class C service to support users' bursty LAN

interconnection applications.

Although Nelsen says data applications will be the driver for ATM services early on, he says voice will play a key role in the evolution of ATM network offerings.

'As we look forward, we see that voice is a very big part of ATM," Nelsen says. "We see voice coming in from our private branch exchanges, which will have an ATM interface, and as sound for multimedia applications."

AT&T's Class C ATM service will support applications including LAN interconnection, imaging, scientific visualization, computeraided design and manufacturing, and host-tohost data communications, Nelsen says. "This service is connection-oriented and can accept some delay.'

Unlike its rivals, AT&T expects users will show some interest in Class D service and says it will be positioned to provide a connectionless, variable bit rate offering.

"With Class D service, equipment doesn't have to do anything to establish a connection,"

Nelsen says. "[Devices] can drop addressed cells into the net and away they go."

Nelsen says Class D service is best suited for firms that have many LANs but don't want to provision connections from every single point to every other point. "If communications between end points is infrequent, [a] connectionless CROSBY service is best."



AT&T, like Sprint and WilTel, has established an equipment certification program under which AT&T will certify customer premises equipment for use with its ATM service. It has established two ATM laboratories. One is used for equipment certification, while the second can be used by companies to test customer premises equipment for interoperability with the AT&T net and simulate their ATM applications. Nelsen says both labs play a critical role in AT&T's ATM service evolution.

MCI — THE WILD CARD

MCI is the wild card in the emerging ATM services market.

Paul Weichselbaum, MCI's vice president of data marketing, says the carrier will roll out an ATM service at T-3 speeds in 1994. He also says the carrier is testing several switches in its laboratories but has not yet decided which switch or switches it will use to deliver the service.

Weichselbaum says the planned MCI service would be useful to organizations with applications including high-speed access to supercomputers but would not provide a detailed description of MCI's ATM plans (NW, May 31, page 25).

Overall, is this enough information for a network manager to base a major purchasing decision on? Probably not, but it'll get buyers into the showroom.

→ Wallace is a senior editor at Network World.

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Help desk

Continued from page 2

to change the packet size, you should change the packet sizes on all the NICs at once or some workstations may have a problem communicating with the file server.

Several readers contacted NW inquiring about the differences between and the interchangeability of PCMCIA cards Types 1, 2 and 3.

Andrew Prophet, founder of AP Research, a Cupertino, Calif.-based market research and consulting firm replies:

The difference between the three types of PCMCIA cards involves their physical dimensions. All PCMCIA cards have the same width, 54mm, and length, 85mm. However, the thickness of the cards varies. A Type 1 card is 3.3mm thick, a Type 2 is 5.5mm thick and a Type 3 is 10.5mm thick.

Small rotating magnetic media disk drive cards, such as those announced by Hewlett-Packard Co., Maxtor Corp. or MiniStor Peripherals Corp., are only available in a Type 3 form factor. Most fax/modem cards or local-area network cards are Type 1 or 2, and many of the first-generation memory cards were Type 1 cards.

The important points to note about inter-

changing the three different cards is the number of PCMCIA slots on the host computer and the sizes of those slots. Most new portables come with one Type 2 or Type 3 slot, meaning the platform can accept a card with the appropriate thickness. If the computer can accept a Type 3 card (the largest slot size), it can also accept a thinner card, such as Type 1 or 2. However, if the machine will only accept one Type 1 card, it will not be able to receive a Type 2 or 3. Some machines offer more than one slot, thus allowing the user to use more than one card simultaneously.

Some of the more recent machines have a special Type 3 slot that will accept two Type 2 cards, which allow the user to have both cards in the platform simultaneously.

Letters

Continued from page 43

bility. The choice is this: Should the general public, through government tax dollars, bear the burden, or should the industry share its profits with the creators of this technology?

> Robert Fougner Director of licensing Public Key Partners, Inc. Sunnyvale, Calif.

Routers revisited

Network World does a great service for its readers in publishing Buyer's Guides and roundup articles, giving users the big picture. Readers value what NW publishes. That is why we felt the need to clarify our standing in the market with you, and supply you with updated information.

We felt there were oversights in the Buyer's Guide article on routers (Sept. 27, page 44).

The Short List reads "1993 Network World Short List." It implies to readers that these are products/vendors that NW recommends, not the opinion of the consultant who wrote the article. This is very damaging for CrossComm Corp. because our customers, prospects and the investment community value what NW recommends.

In the section where techniques for routing Systems Network Architecture were outlined, CrossComm's Protocol Independent Routing (PIR) was completely absent from the article. Most of our customers use PIR to route Systems Network Architecture because of its superior performance over encapsulation. Another technique missing is source routing.

NW did a feature article on the ILAN XL80 in the May 10 issue. This article describes the ILAN XL80 as having a parallel processing architecture "notably different from high-end approaches put forth by vendors like Cisco Systems, Inc., and Wellfleet Communications, Inc." In the Buyer's Guide article, there was no mention of this architecture.

A report by your sister company, International Data Corp. (IDC), states: "Cross-Comm's XL80 hardware in combination with PIR software offers state-of-the-art LAN internetworking to IBM networks." The ILAN XL80 Backbone Router is also Asynchronous Transfer Mode-ready. The product has been shipping since June of this year.

Lastly, the chart titled "Router market leaders," is misleading. Only if someone reads the text would they know that this is a survey of 78 readers. It inadvertently suggests Cisco owns 40% of the router market. According to a 1993 IDC study, in the IBM/SNA environment, CrossComm has almost the same market share as Cisco. The article surrounding the chart states: "The top vendor choices among readers are Cisco Systems, Inc. with a dominant 40% market share, followed by Wellfleet Communications, Inc., with a market share of 17%." Market share is not the correct term, and is misleading to readers. The 40% is based on the readers surveyed (additionally, these readers may not even be users).

> Nancy Baptiste Director, marketing communications CrossComm Corp. Marlborough, Mass.

Editor's reply: NW's Short List entries are compiled as a colloborative effort between the publication's features staff and the author of the article. NW partners with notable industry consultants, analysts and independent integrators largely to draw upon their expertise for product insight into a particular market segment. The publication also relies on the knowledge of these partners to recommend products and services for The Short List.

A discussion of source routing was withheld from the main Buyer's Guide article due to space constraints, but the publication did indicate vendor support for the technology in the charts beginning on page 45 of that issue. It is true the author omitted a discussion of PIR from the Buyer's Guide section on SNA support; NW in fact did not focus on any proprietary solutions.

CrossComm suggests the Buyer's Guide article overlooked the vendor's parallel processing architecture. Nowhere did the article probe each vendors' router design. Instead, the author raised points about product architectures in general, including the pros and cons of bus-based vs. parallel processing architectures.

CrossComm also points out that the ILAN XL80 is ATM-ready; however, NW asked only for products that currently support ATM. While the XL80 does have a matrix switch design to accommodate ATM in the future, consultants agree CrossComm will have to take other measures to make the box fully ATM compliant.

CrossComm's point that the graphic labeled "Market share leaders" was incorrect is valid. That graphic should have been labeled "Survey respondents' primary router suppliers." It depicted the primary router suppliers of survey respondents to put their other comments in perspective.

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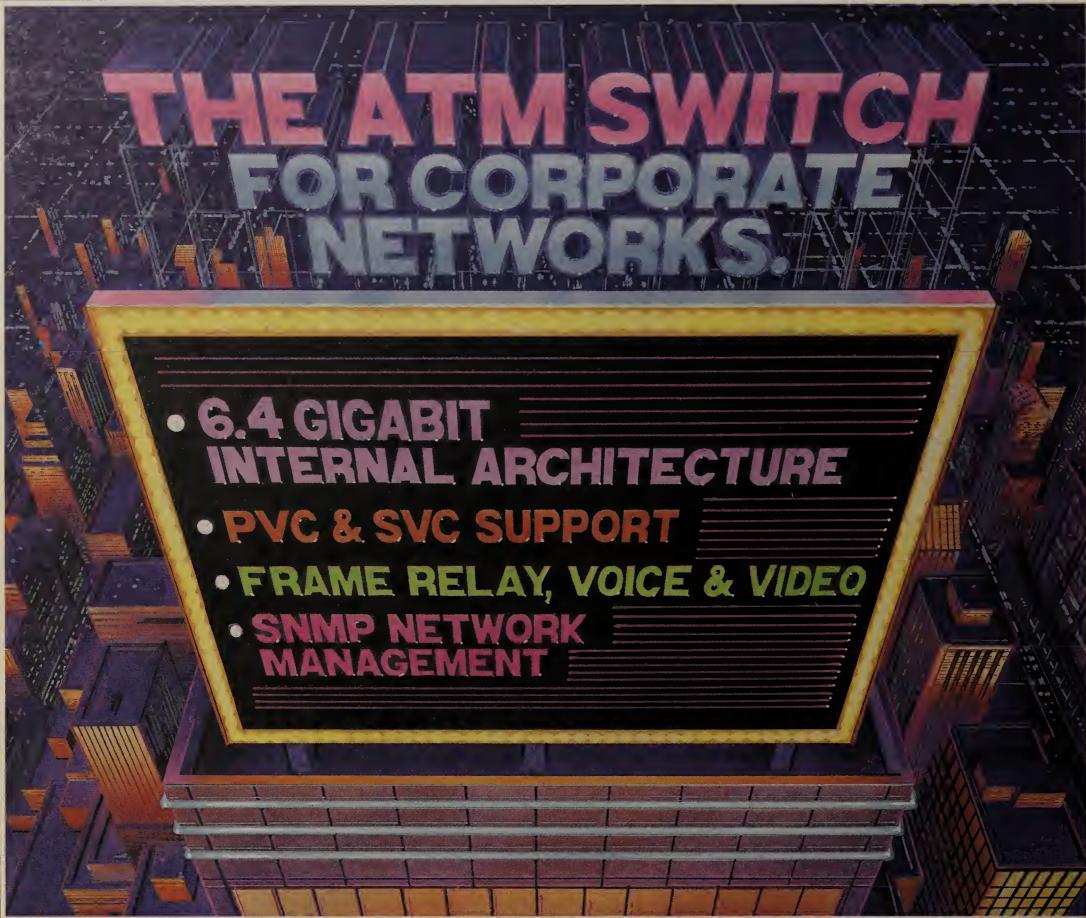


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Cisco

Continued from page8

port the same protocols and local-area network interfaces as Cisco's higher end routers. Widearea ports will support speeds of up to T-1.

The card will be available in mid-1994 through Cisco and third-party resellers. Pricing has not yet been set but will run under \$3,000, Cisco said.

Cisco and Microsoft also said they will work together to achieve interoperability between the companies' respective network management systems — CiscoWorks and Hermes.

TEAMING ON ATM, HUBS

Cisco last week also announced that it will resell NCR's UniverCell ATM switch. The switch will consolidate traffic from Cisco routers, which will be outfitted with an ATM Interface Processor by early 1994, to create collapsed ATM backbone nets. The switch has an aggregate throughput of 800M bit/sec and individual port speeds of 100M bit/sec.

Cisco and NCR will also work together to integrate routing into the UniverCell switch. That capability is expected to be available by the end of next year. Cisco also announced that it will jointly develop a low-end stackable hub with LanOptics that will provide users with integrated routing and hubbing capabilities in a single device.

Although the companies declined to provide details, they said a module based on Cis-

VSI

Continued from page 9

The proprietary personal computer-based management system collects diagnostic data from "smart connectors," which attach to any brand of peripheral equipment. Management data is relayed to the monitor upon the users request.

"If a problem occurs in setting up the call, the system controller dials out over the phone line to query the devices on the network and finds out what the problem is," said Ronald Johnson, director of marketing at VSI.

Users can determine what the configuration of remote codec should be and reset it, if needed

The VSI Omega is equipped with an internal modem so technicians can access the PC-based controller remotely to handle problems, obviating the need to send out technicians to troubleshoot problems in many cases, Johnson said

The Omega's control system can accommodate any videoconferencing codec or inverse multiplexer, which preserves users' investments in existing equipment and helps them maintain consistency across older systems.

VSI plans to add automatic conference initation, reservations and scheduling software in the second quarter of 1994. This would let users reserve use of the videoconferencing system in advance, and then have the call automatically set up and shut down, if desired.

By the end of next year, VSI plans to expand the network management system features with capabilities such as proactive alarms, and health and status reports.

The mouse-operated Omega starts at \$50,000 and tops out at \$80,000, depending on configuration.

©VSI: (404) 242-7566.

co's existing 3000 access router will be integrated into a hub based, in part, on LanOptics' StarNet hub.

The Cisco 3000 is equipped with flash erasable programmable read-only memory capabilities to let users download software configurations and upgrades from a central site. Available in two- and three-port configurations, the 3000 supports the same protocols and LAN/WAN interfaces as Cisco's higher end AGS+ and 7000 routers.

The integrated router/hub will be available in mid-1994. Pricing has not been set.

Finally, Cisco introduced software that lets

users create router configurations that can be duplicated on routers throughout the network.

Dubbed the Cisco Configuration Builder, the software lets net managers view and change configuration parameters and configure multiple routers simultaneously from the same screen.

It also provides predefined configuration building blocks that help reduce errors and configuration setup time. A security filter or priority queuing list that is common to multiple routers, for instance, need not be generated anew for each configuration.

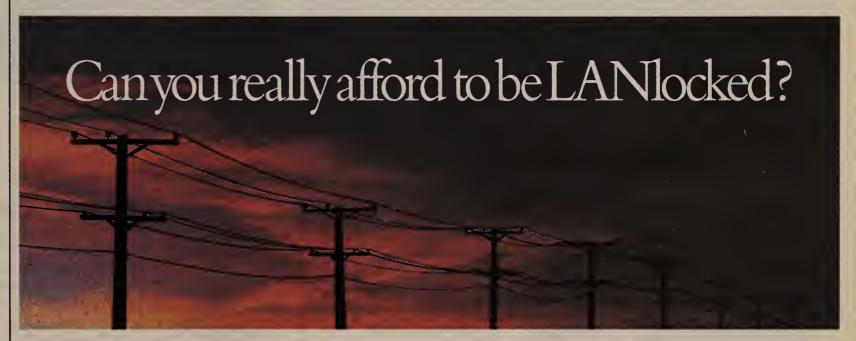
In addition, each configuration window

provides context-sensitive help so that a user of Novell, Inc. products, for example, can instantly view an explanation of Novell Service Advertising Protocol filters and available services

The software costs \$495 and will be available early next year for a Windows-based PC platform running Windows 3.1. By late 1994, the software will be ported to the vendor's family of CiscoWorks router management applications that run on SunConnect's SunNet Manager, Hewlett-Packard Co.'s OpenView and IBM's NetView/6000.

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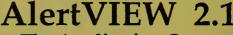
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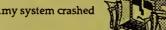


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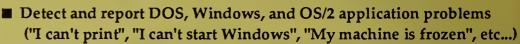
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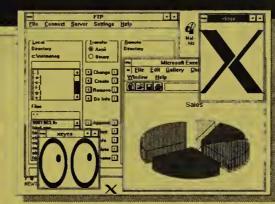
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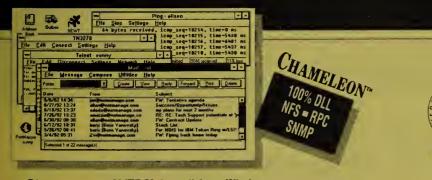
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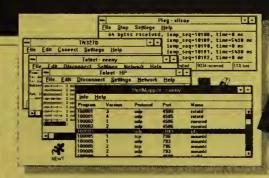
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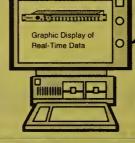
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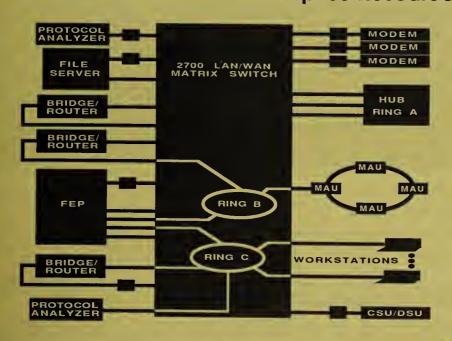
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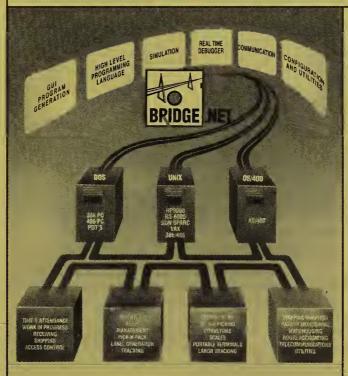
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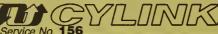
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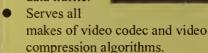
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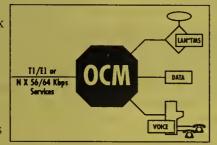
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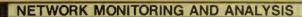


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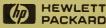
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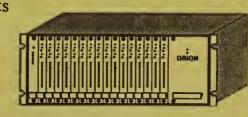
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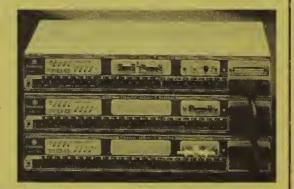
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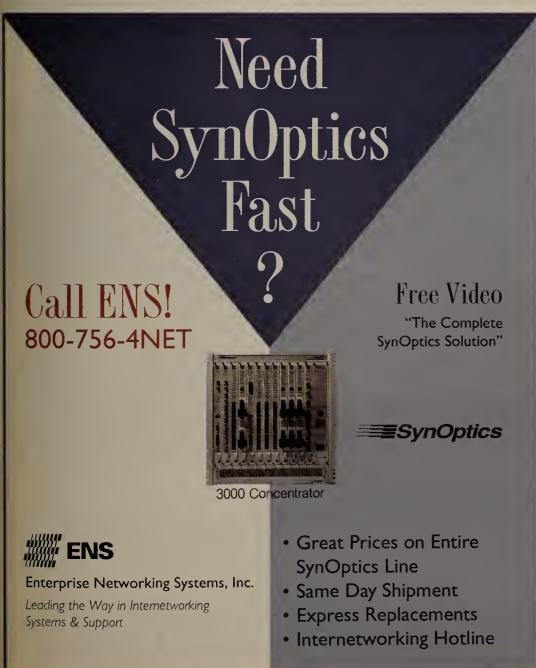
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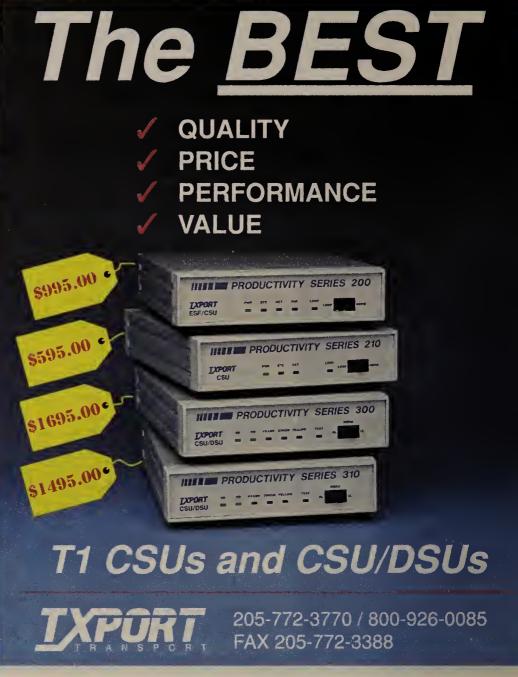
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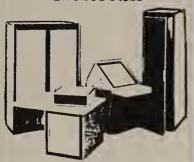
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Splash

Continued from page 1

departmental hub of hubs, a campus backbone node or a backbone node for private WANs. Crossbar switches provide simultaneous fullduplex connections between ports so switch throughput actually increases as more ports

The DEC switch, which does not yet have a name, sports 13 slots for four-port input and output modules. The modules support 155M bit/sec ATM and T-3 interfaces.

The switch can be used to receive ATM cells from workstations, LAN hubs, routers and other switches and forward them to another premises switch or to the WAN.

Although the switch does not support LAN interfaces, existing Ethernets will be brought onto the ATM backbone through a new module for the DEChub 900 MultiSwitch hub.

DIFFERENTIATORS

DEC is distinguishing the switch from competitive offerings through its flow control and congestion management software.

The company's Flowmaster software pro-

vides flow control for bursty LAN traffic using a credit-based class of service, whereby the receiving node issues transmission credits to the sender based on available buffer space. During data transmission, the downstream port transmits credits that tell the sender how much more data the receiver can accept.

That eliminates the need for the sender to continually wait for the receiver to issue acknowledgment packets, Raderman said.

For delay-sensitive voice, video and constant bit rate traffic, DEC's switch supports the ATM Forum class-of-service standards. Those standards allow users to define priority and

class-of-service transmission requirements for delay-sensitive traffic.

DEC's switch also features a bandwidth efficiency system called Switchmaster. This software ensures that transmission is not delayed by cells waiting to access a busy output port, Raderman said.

For example, a buffer queue might hold five cells destined for the same output port. If that output port is congested, the cells behind them will have to wait, even if they are destined for another output port.

Switchmaster avoids that delay by reaching behind those first five cells to pull the other cells out of the queue and send them on their way. That allows users to realize 95% to 96% of the DEC switch's bandwidth, as opposed to 60% without the technique, Raderman said.

For rerouting around failed circuits, the switch supports a feature DEC calls Resilient Virtual Circuits (RVC). RVCs are a mesh of virtual circuits between an end station and the switch. A subset of these RVCs will be used for

actual transmission, while the others are merely defined paths that the switch can activate if one of the active RVCs goes down.

Though other vendors' switches include various techniques for cirrestoral, DEC's switches are the only ones to date that predefine alternate paths for circuits, virtual said Frank Dzubeck, president of Communications Network Architects, Inc., a Washington, D.C. con-

sultancy. DEC also announced a scaleddown version of the premises ATM switch for smaller work groups. That device, called the work group ATM switch for now, is a 3.2G bit/sec, fourcrossbar switch that supports the same line interface modules as the premises switch.

In 1995, DEC plans to roll out a 622M bit/sec Synchronous Optical Network ATM module for the switch. Will interconnect switches and a switched FDDI LANs over ATM nets at T-3 speed. two-port card that will work with carrier ATM services

The premises switch will ship in first-quarter 1994. The work group switch will also ship next year, though DEC did not specify a date.

DEC has not yet established pricing for any of the new products.

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for TURBOchannel busbased DEC's 3000 AXP workstations and servers, and for PCI busbased systems. The **TURBOchannel adapter** will ship in the first quarter, while the PCI adapter will ship sometime in 1994.

 PCI bus adapters that support Asynchronous Transfer Mode (ATM) overunshieldedtwisted pair. Speed undetermined. Also, a PCI bus adapterthatrunsat 622M bit/sec over fiber. Will ship in 1995.

 Ethernet-to-ATM interface for DEChub 900 MultiSwitch. Connects Ethernets to ATM backbones. The module supports 6 Ethernet ports and 1155M bit/sec SONET port. Will ship in 1994.

 Personal Ethernet-to-ATM module for DEChub 900. Connects switched Ethernets to ATM nets. Will ship in 1995.

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Continued from page 1

solidate multiple Synchronous Data Link Control and/or LAN lines onto a single frame relay link," said Hobie Love, IBM's NCP product design and performance manager. "[That] reduces the number of links in the network and, at the same time, reduces complexity. Plus, frame relay allows traffic flowing over one physical line to be routed to a variety of destinations."

Users can realize these advantages whether they build SNA nets based on public or private frame relay services.

However, IBM's Love noted that large SNA users implementing private frame relay nets could see a 50% increase in performance over today's SDLC leased lines by implementing the 3745 as frame relay Data Circuit-terminating Equipment and using functions found in NCP 6.2.

One of those functions is Intermediate Network Node routing, which lets users attach multiple SNA devices to a single frame relay access line and have them pass data quickly through multiple NCPs.

In the past, each SNA device had to be defined to a particular port on each 3745 and within each NCP, Love said.

"NCPs with [Data Circuit-terminating Equipment] route data directly to its destination without the overhead of SNA processing at each NCP, making traffic flow faster and more efficiently," Love said.

IBM is not alone in its frame relay efforts. Other vendors — such as Ascom Timeplex, Inc., Cisco Systems, Inc. and Wellfleet Communications, Inc. — have all made a concerted effort to make it easier to bring SNA and frame relay together with their router products, as has IBM with its 6611 router.

Ascom Timeplex, for example, recently unveiled a new Enterprise Router that counts among its features the ability to give SNA traffic priority in a multiprotocol frame relay environment.

DTE, DCE defined

DTE (data terminal equipment)
Devices where data transmissions originate and terminate. In frame relay parlance, DTE is known as Frame Relay Termination Equipment (FRTE). FRTE can forge links to public frame relay services but do not have the intelligence to act as frame relay switches.

DCE (Data circuit-terminating equipment or data communications equipment)
Products used to connect DTE equipment to a communications line. In a frame relay environment, DCE is known as a Frame Relay Frame Handler (FRFH), a box that can support public frame relay services and link to other FRFHs to form a private frame relay net.

GRAPHIC BY SUSAN SLATER

Anura Guruge, an independent analyst based in New Ipswich, N.H., said frame relay is one more tool users can employ to create multiprotocol backbone networks.

Traditional SNA wide-area circuits could only carry SNA; frame relay nets can theoretically carry much more, although to date realizing that goal has been difficult in SNA environments.

That will change come January, when IBM

ships NCP 7.1. With it, users will be able to connect any SNA device — from the Application System/400, 3174 Establishment Controller and 6611 router to IBM's Route Xpander/2, a remote office router — directly to any public or private frame relay net.

The new NCP will also bring support for the Internet Engineering Task Force RFC 1294, which defines specifications that promote interoperability between frame relay equipment from different vendors.

Likewise, it will support RFC 1490, which defines how SNA traffic should flow over frame relay links.

"Only like-to-like communications across the backbone were permitted with NCP 6.2, so users had to have similar 6611s or RouteX-pander/2s at both ends of the link; it was a limitation to deploying frame relay extensively," said Miriam Green, product manager for IBM's NCP products.

Pieces of IBM's frame

relay puzzle

Network Control Program 6.2 with Data Circuit-terminating Equipment support

Support for RFC 1294 - multivendor

Support for RFC 1490 - frame relay

6611 router

RouteXpander/2

GRAPHIC BY

3174 Establishment

frame relay interoperability

interoperability with SNA.

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In fact, frame relay will play an important role in migrating existing SNA

users to APPN. A single frame relay link can support multiple virtual circuits, each of which can support a different APPN node. That makes it easier for various APPN nodes to forge links with one another as compared with traditional meshed networks made up of leased lines.

The 3745 with frame relay can also automatically route around line failures, something existing SDLC and APPN implementations cannot do, although the addition of APPN High Performance Routing (HPR) software to existing APPN nodes next year will fix that problem, Green said.

IBM also notes that APPN, with its HPR functions, will help control data flow and prevent congestion, thus addressing a key concern about frame relay nets.

Proponents say congestion shouldn't be much of an issue because one of frame relay's advantages over existing SDLC links is that bandwidth limits aren't set in stone and can fluctuate somewhat according to traffic loads.

AT&T, for example, offers a frame relay service that lets users exceed their committed information rate (CIR), which is the minimum amount of bandwidth to which they are guaranteed access.

In some instances, the service lets users burst above the CIR for long periods of time, with the only limit being the speed of their access link (NW, Oct. 11, page 1).

IBM said the 3745 also addresses the frame relay congestion concern by supporting Forward Explicit Congestion Notification and Backward Explicit Congestion Notification, which control the flow of data across the frame relay net.

"We expect to see a lot more demand from SNA users for frame relay in 1994," Green said. "We think the frame relay picture is complete enough now for users to see what they can and cannot do with it."

Success

Continued from page 1

frame relay will be minimal, those with complex meshed networks are banking on the technology to reduce line costs and simplify configurations.

Advantis in Shaumberg, Ill., is looking to frame relay to consolidate its three large SNA nets and provide a migration path to Asynchronous Transfer Mode (ATM).

"We expect to see a tremendous drop in the number of physical circuits we'll need to bring into the 3745," said Jim Zatloukal, manager of net software development at Advantis, the value-added network-

ing company formed last year by IBM and Sears, Roebuck and Co. "For example, 50 SDLC circuits can be melded into one frame relay port that will save ports on the 3745s and consolidate lines in the net."

This is possible because frame relay lets users support multiple permanent virtual circuits, each roughly equivalent to a leased line, through a single access link.

Zatloukal also said the company will make use of the data circuit-terminating equipment fast Intermediate Network Node (INN) routing function found in the Network Control Program (NCP) Version 6 Release 2.

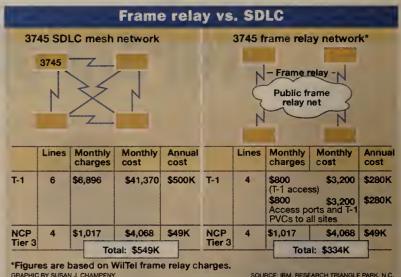
INN will let 3745s route data directly to its destination without the overhead of SNA processing at each NCP, making traffic flow faster and more efficiently.

"That feature will reduce the number of hops in the network and give us better performance," Zatloukal said.

Frame relay also fits into Advantis' plan to beta-test IBM's forthcoming Transport Network Node ATM switch.

PaineWebber has built a nationwide private frame relay net using Network Equipment Technologies, Inc.'s (NET) FRX products to support 3270 and local-area network traffic. The FRX is a packet processing engine for NET's T-1 multiplexers.

"We've seen a 30% to 40% reduction of wide-area circuit costs since implementing the



frame relay net," Randall said. "This is due to the consolidation of existing lines and the better performance of the frame relay network."

Randall said that if the frame relay/SNA net has a downside, it is that the technology is so new, it can take time to troubleshoot problems.

CUTTING OVER

Continental Insurance, Inc. in Neptune, N.J., is in the process of cutting over its point-to-point SNA net to a hybrid private/public frame relay net.

By mid-1994, Walter Parezo, network planning project leader, said the company will reduce its wide-area network costs from \$100,000 to \$60,000 per month.

What attracted the firm to frame relay was its ability to support multiple users and equipment via a single frame relay pipe.

In the past, each piece of equipment required its own line. This capability let the company create a mesh network with only a single access link from each of its 50 remote sites.

Other users remain uncommitted to moving their SNA nets to frame relay.

"It still sounds too

"It still sounds too expensive for what we do," said James Frost, manager of operations for Western Resources, Inc., a utility firm based in Topeka, Kan. "Our current networking needs don't justify it."

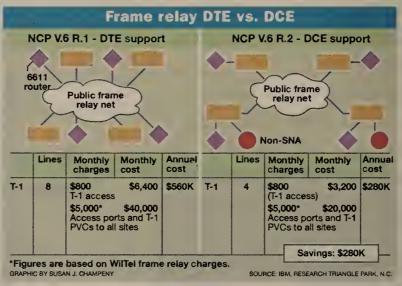
The utility has only a

few T-1 links running mostly SNA. Frost said that because the network configuration is

relatively simple, his company would not realize the benefits frame relay could bring a more complicated net.

Others are finding the idea of implementing SNA and frame relay too much to deal with right now.

"We are interested, but really, we have so much else on our plate right now — client/server and there's a lot of interest in [Advanced Peer-to-Peer Networking] — that frame relay has taken a back burner," said one user who requested anonymity. "There is a technology overload right now, and we are waiting for some of the smoke to clear."



"The switch will provide support for frame relay nets, so it is important for us to get our SNA nets in position to utilize ATM in the future," Zatloukal said. "That is our ultimate driving force to implement frame relay in our SNA networks."

Users at PaineWebber, Inc. in New York echoed that sentiment.

"We wanted frame relay because of its cost savings, but we also like where it will take us in the future — that is, ATM and other fast packet technologies," said Tom Randall, corporate vice president of telecommunications at the investment services company.

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